The Dissertation Committee for Wen-Miao Liu **Certifies that this is the approved version of the following dissertation:**

Memory Knowledge and Beliefs among Taiwanese Older Adults

Committee:

Graham McDougall, Supervisor

Gayle Acton

Heather Becker

Deborah Volker

Namkee Choi

Memory Knowledge and Beliefs among Taiwanese Older Adults

by

Wen-Miao Liu, B.S.N.; M.S.N.

Dissertation

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Doctor of Philosophy

The University of Texas at Austin

May 2008

Dedication

To the Buddha

To my parents

To my husband and daughter

Acknowledgements

There were a number of people who contributed to the completion of this dissertation. Here are just a few. First I would like to convey my heartfelt gratitude to my advisor, Dr. Graham McDougall, for his advice, tutelage, support, and humor through all stages of this academic endeavor. I owe my appreciation to Dr. Gayle Acton, who instructed me from the beginning of my doctoral life, and whose expertise in theory evaluation enlightened my eyes in studying this hard subject. I am also grateful for Dr. Debbie Volker's guidance and loving support from the beginning of the qualifying exam until now. I am thankful for Dr. Heather Becker for her expert advice in statistics and for her willingness to give generously her time and support. To Dr. Namkee Choi, for sharing her expertise in gerontology and for her warm support, is greatly appreciated.

This study would not be made possible without the support from my friends and from Taiwanese older adults participated in this study. I would like to express my gratitude for Hung-Lan Wu, who companied me from the first day of the class until the end of this doctoral journey. Special thanks to Shing-Mei Chen, Yu-Mei Ching, Howard Donnell, Tina Lin, Yi Liu and Ching-Yu Cheng. I would also like to thank Epsilon Theta Chapter, Sigma Theta Tau International for awarding me a research grant for use in conducting this study.

Finally, I wish to express my profound appreciation to my family. The first and foremost are my father and mother, for their longtime and unconditional support, caring and encouragement, and the belief that their daughter can accomplish her goal. My

parents-in-law are especially appreciated for their understanding and support while I am away from home. I owe so much to my loving daughter, Shanna, for her understanding that the mommy is not always at her side when she needs me. I am blessed to have my husband Shu-Kai Cheng in my life and doubly blessed by his love, patience, generosity, support and encouragement. During this period of doctoral study, Shu-Kai is always there when I need him and shares my struggles and triumphs. Words cannot adequately describe my appreciation.

Memory Knowledge and Beliefs among Taiwanese Older Adults

Publication No._____

Wen-Miao Liu, Ph.D.

The University of Texas at Austin, 2008

Supervisor: Graham McDougall

Decline of memory is often a complaint registered by members of an older adult population. There has been a limited amount of previous research evaluating subjective and objective memory in elderly Asian cultures. The purpose of this study was to explore factors related to memory function among Taiwanese older adults which included the following: the individual's characteristics, perception of metamemory, degree of memory self-efficacy, and level of memory performance.

This was a cross-sectional, descriptive, and correlational study. A proposed conceptual framework, based on the previous literature, was developed as the guideline for the study. Well established instruments were employed in measuring participants' memory knowledge and attitudes, namely metamemory, (Metamemory in Adulthood), memory self-efficacy (Memory Efficacy), and memory performance (Rivermead Behavioural Memory Test). A non-probability sample of 130 Taiwanese older adults completed the interview.

The research findings indicated that the participants reported above average knowledge of memory processes, achievement motivation regarding memory, a good memory capacity, personal control over their memory, and an ability to use memory

strategies. In contrast, they perceived their memory as declining over time and were slightly anxious when considering memory tasks. In addition, they displayed a moderate level of confidence about their own memory, with elderly males expressing more confidence than females about their memory abilities. The memory performance of older Taiwanese adults was in the range of poor memory on the Rivermead. Factors contributing to memory function were correlated with each other. As stated above, these were individual characteristics, metamemory and memory self-efficacy. Significant predictors for memory performance were age, education, health status and memory self-efficacy.

The results of this study suggested that culture-specific factors regarding memory are vital for older Taiwanese adults to evaluate their own memory. Potential topics for future research include: exploring the meaning of memory with an in-depth interview to distinguish memory self-efficacy from positive adaptation to memory deficit; understanding how memory operates while participants work in pairs rather than individually; and implementing an interventional program for health and cognitive promotion.

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction

Background and Significance

Memory function is one of the most important mental capacities that humans possess; without it, individuals cannot live independently (Budson & Price, 2005; Dye, 1989). The symptom of memory decline is one of the most frequently encountered complaints in the elderly (Glodzik-Sobanska et al., 2007; Levy-Cushman & Abeles, 1998; Smith, 1996), with an estimated prevalence of between 25% and 50% for those community dwellers over the age of 65 years (Jonker, Geerlings, & Schmand, 2000). Loss of memory function has long been associated with the changes that denote the onset of old age. Memory complaints are known to be widespread among the aged, who frequently find memory failures more upsetting than their younger counterparts (Cavanaugh, Grady, & Perlmutter, 1983). Indeed, the increase of memory decline, concurrent with aging, has been verified by empirical studies (Einstein, McDaniel, Manzi, Cochran, & Baker, 2000; Salthouse, 2004; Souchay & Isingrini, 2004a)

With the rapid worldwide increase of the elderly population, healthcare costs have also risen. Older adults in today's societies are faced with a constantly changing healthcare environment, one driven by cost control demands for shorter doctor visits and abbreviated hospital stays. Therefore, elders must immediately understand the information given to them during hospital stays and doctor visits (Brown & Park, 2003), so that they may maintain a level of health function which enables them to live independently. Aging persons who are challenged by actual or perceived memory decline, therefore, may find it difficult to access proper care in such an environment

(Palmer, 2006). Furthermore, the often subtle or ambiguous symptoms of declining memory function in elderly patients may be very challenging for healthcare practitioners to diagnose in cursory examinations. Researchers have explored types of memory problems, as well as interventions that may assist older adults in comprehending educational information during hospital visits. This increased comprehension enhances the elderly clients' ability to live independently, and minimizes the likelihood of their placement in assisted living facilities (Jennings & Darwin, 2003; Palmer, 2006; Turvey, Schultz, Arndt, Wallace, & Herzog, 2000).

The memory is evaluated using self-report and performance tasks. There are over thirty types of memory performance identified in research. The self-report of memory is not so broadly defined and includes discrete areas of inquiry, including metamemory and memory self-efficacy, both of which will be discussed below. Two additional domains, memory monitoring and memory complaints, will be analyzed in Chapter two.

Subjective evaluation of memory, or metamemory, encompasses four main aspects: self-referent knowledge, personal awareness, attitudes related to one's memory function, and judgments regarding effective strategies to complete memory tasks (Cavanaugh, 1996; Hertzog, Dixon, & Hultsch, 1990b). Individuals' self-perceived memory will influence their subsequent memory performance. For instance, people with poorer impressions of their memory also report using memory strategies (e.g., notepads or rehearsals) more than people who perceive themselves as having a good memory. Diverse media reports about the nature of Alzheimer's disease have increased the public's awareness of their own memory function. Consequently, if people understand their subjective memory, it will help them identify their concerns (Herrmann, 1990;

McDougall & Balyer, 1998). Individuals who are unable to judge their memory's function adequately may either continue to engage in potentially risky activities or seek unnecessary memory treatment that could disrupt their daily activities (Turvey et al., 2000). The study of metamemory in older adults is especially important because of the greater likelihood that they may experience memory decline.

Substantial information related to older adults' perception of memory may be gathered via a research method known as self-reports. Rabbit and Abson (1990) claim that researchers should be cautious in employing self-report questionnaires to measure memory because of methodological and empirical difficulties. For example, it is difficult to validate one's own everyday competence objectively, since the elderly participants may underreport their lapses due to memory decline. They further argue that "people cannot make absolute judgments about their own competence, and can only evaluate themselves against the performance of others, or the demands of their particular environment" (p. 15). However, subjective evaluation of one's ability in a particular task may provide useful insights toward understanding individual competency differences (Rabbitt & Abson, 1990). Studies investigating the accuracy of self-assessment for memory performance have produced mixed results (Best, Hamlett, & Davis, 1992; Glodzik-Sobanska et al., 2007; Levy-Cushman & Abeles, 1998; Mattos, et al., 2003). Therefore, health care professionals should be cautious and proactive as they evaluate complaints about memory in order to assist their patients.

Another facet of subjective evaluation of memory is memory self-efficacy. The concept of self-efficacy refers to one's confidence in his or her ability to perform memory tasks effectively in a particular situation (Bandura, 1997). The term "memory self-

efficacy" was first coined by metamemory researchers (Hertzog, Dixon, Schulenberg, & Hultsch, 1987). Memory self-efficacy has been defined as "beliefs about one's own capability to use memory effectively in different situations" (Hertzog, Dixon, & Hultsch, 1990a, p. 174). Understanding memory self-efficacy in older adults is critical to helping them to distinguish their memory knowledge from their memory beliefs. For example, an older individual may have an extensive and accurate knowledge about how memory works but may also believe that his or her ability to remember is poor (Hertzog, Dixon, & Hultsch, 1990a, 1990b). Indeed, research on self-efficacy in adulthood reveals that memory self-efficacy in older adults is usually not as strong as it is for younger adults (Berry, West, & Dennehey, 1989; Luszcz, 1993; West & Berry, 1994; West & Yassuda, 2004). As the result, metamemory researchers have devoted their efforts toward strategies designed to improve older adults' memory efficacy which will enhance their confidence in memory-demanding situations.

The objective evaluation of older adults' memory performance is an essential examination of their capability to function in their everyday lives. Baddeley (1988) provided three broad approaches to the measurement of memory. First, memory is an index of the central nervous system (CNS), and a decline in its performance signals a problem. Next, a variety of tasks that measure different parts of the memory system allow for diagnostic specificity. Age-related memory performance varies greatly depending on the type of memory being tested. Examples include the following: processing speed, free recall, list recall, prose recall, or memory span. Older adults may experience a decrease in certain aspects of memory. For example, episodic memory performance (for names, faces, or stories) generally declines with advancing age (Salthouse, 1996), whereas a

decline in semantic memory (i.e., world knowledge and vocabularies) is less likely (Hultsch, Hertzog, & Dixon, 1998). Third, everyday memory tasks (e.g., remembering an appointment or the location of common objects) versus laboratory-based tasks (e.g., recalling a list of words or a pair of unrelated words) in memory performance is a matter of debate in substantive literature. The measurement of everyday memory is more realistic and provides ecological validity to the individuals' specific memory problems in their everyday environment (Baddeley, 1988; Cockburn & Smith, 1991; Cohen, 1996).

Memory performance, whether measured by laboratory-based tasks or everyday tasks, can be viewed as a complex behavior that requires the integration of a person's cognitive and behavioral capacity (Hertzog, 1992). To complete a memory performance, individuals must specify performance goals, devise strategies for achieving those goals, and monitor the degree of success both in enabling adaptive changes to behavior and in achieving optimal memory performance. Although there has been considerable debate regarding the types of assessment used in memory research, there must be an examination of memory performance, the skill that older adults need to maintain and manage everyday memory tasks and to continue living independently.

Taiwan's aging population and concerns with cognitive function

The population of the future will show a considerable increase in the percentage of elderly. That proportion is expected to double in developed countries, where people tend to live longer. Taiwan is included in this trend. The senior population in Taiwan currently constitutes 10.04% of the total population and is expected to increase to 20.67% of the population by 2027 (Ministry of Interior, 2007, August). Despite the fact that the number of older adults is increasing rapidly, cognitive aging, specifically memory

function, is less systematically investigated in Taiwan than in Western countries. There is a relatively small amount of literature concerning older adults' memory knowledge and beliefs in Taiwan. Most Taiwanese studies relating to memory examine dementia or Alzheimer's disease in terms of its prevalence or to the methods of cognitive treatment (Lin et al., 1998; Liu, Wang, Lin, & Liu, 2007; Liu et al., 1996; Liu, Tai, Lin, & Lai, 2000). One study, however, compared memory monitoring between young and older populations (Chiu, 2004), and another one examined older adults' subjective memory complaints with respect to cognitive performance and depression (Wang et al., 2000). Exploring elderly Taiwanese's memory knowledge and attitudes as well as their memory performance can facilitate the delivery of appropriate nursing care, which will enable them to live independently.

In Taiwan, as in the rest of world, a person's attitudes about aging may influence his/her memory performance. Consequently, a different pattern of memory performance may be represented in Eastern and Western cultures, suggesting that an individual with a more positive attitude about aging is likely to display better memory performance. Asian societies are perceived to hold a more positive view of aging, whereas Westerners tend to value a more youth-oriented culture and, therefore, are likely to possess more negative stereotypes about aging (Jin, Ryan, & Anas, 2001; Levy, 1999; Levy & Langer, 1994). Researchers reported that older Asian adults perform better on memory tasks than older American adults because of the lack of ageism in Asian culture (Levy & Langer, 1994). However, this viewpoint of positive aging in Asian culture has been challenged in other literature (Boduroglu, Yoon, Ting, & Park, 2006; Yoon, Hasher, Feinberg, Rahhal, & Winocur, 2000). Although the current study does not evaluate attitudes of aging and

memory across-culturally, it does introduce an examination of Taiwanese older adults' memory attitudes and performance to wider discussions of memory and aging.

Although the domain of memory function in older adults has been researched less in Taiwan and is less well known, there have been two recent studies examining some aspects of memory knowledge and attitudes in Asian and Asian American older adults. One study investigated the relationship between sleep, physical activity, depression, memory self-efficacy, and memory performance in Taiwanese American older adults (Suen, Morris, & McDougall, 2004). Their findings indicated that memory self-efficacy was the only significant predictor of memory performance. These researchers stated that their finding is consistent with Bandura's (1997) construct of self-efficacy, which suggests that a person with high memory self-efficacy will try harder to meet memory demands. They further argued that age stereotyping, social judgment, and personal experience will influence a person's self-efficacy. They described that the stage of late adulthood as being stereotyped by either immobility, dementia, and a childlike mentality, or, contrastingly, wisdom, patience and rich life experiences. Further, the researchers suggested that the effect of cultural beliefs on memory efficacy in Taiwanese American older adults must be systematically examined (Suen et al., 2004).

An additional study conducted with Asian older adults examines the notion of metamemory in Japanese nursing home residents. This study found that these older adults were highly motivated to perform well in memory tasks, and that depression had an inverse relationship to memory capacity and change (Ide, McDougall, & Wykle, 1999). However, neither of these studies examines the relationship between metamemory and memory performance.

This author closed the lacuna left by the preceding studies through an investigation of the relationship between metamemory, memory self-efficacy and memory performance in Asian older adults. This research focused on both the subjective and objective evaluation of memory function in a sample of Taiwanese older adults, thereby expanding the cognitive aging literature globally. Furthermore, knowing how elderly Taiwanese perceived and utilized their memory would help healthcare providers develop appropriate care and programs for older adults, which would further enable them to live independently.

Significance of the Study to Nursing

As the aging process continues, the demands on the individual to keep up with current information and to acquire new knowledge are also increasing. Older adults with health problems may experience difficulty in obtaining and learning medical information. Consequently, their health status may be threatened, which can result in safety concerns (Palmer, 2006). While interacting with older adults, nurses should be aware of these clients' memory function and verify that they understand the given information adequately, so that they are able to function independently. Given the fact that older adults have more difficulty understanding, remembering and following medical instructions and procedures, they are likely to display poor medication adherence (Brown & Park, 2003). Although there are many reasons for medication non-adherence, nurses with more knowledge about memory function may deliver health information more effectively, in part, because they will use strategies based on older adults' memory processes (Insel, Morrow, Brewer, & Figueredo, 2006; Insel & Cole, 2005).

The goal of gerontological nursing is to promote, restore, and maintain the health of older adults (Lach, 2007). Maintaining memory function is critical to achieving these important goals. It is essential, therefore, that nurses intervene proactively to help older adults under their care to maintain their memory function. Successfully doing so can minimize the need for more intensive and extensive forms of nursing care often required by individuals with severely impaired memory function. Hence, it follows that the study of factors that affect everyday memory has significant implications for the practice of gerontological nursing at large.

In addition, it is not uncommon to hear statements like the following from gerontological nurses: "you're 80 years old; of course, your memory is not as sharp as it used to be" or "Don't worry about your memory; my memory will decline when I have reached your age" (Miller, 1999). If nurses are not aware of human memory processes, they may perceive memory capacity as inevitably declining with advancing age; as a result they may be unlikely to diagnose a memory problem or to suggest memory strategies for their clients to use in managing daily activities.

Purpose

The purpose of this study was to explore the memory self-evaluation phenomena, including metamemory and memory self-efficacy, and to increase the understanding of the objective memory performance among Taiwanese older adults. In addition, this study provided new knowledge on the relationships between individual characteristics, health, metamemory, memory self-efficacy, and memory performance among older Taiwanese adults.

Conceptual Framework

The conceptual framework for this study is adapted from Bandura's self-efficacy construct. Bandura's (1986, 1997) self-efficacy theory is perhaps the most influential theoretical framework for examining the role of self-beliefs in adult human behavior. Although Bandura did not specifically define the term "memory self-efficacy," his general self-efficacy concept refers to "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1997, p. 3). People have beliefs about whether they can execute a behavior required to produce a certain memory outcome and how well they can execute that behavior (Bandura, 1986). Bandura (1989) maintained that this perceived self-efficacy in the realm of memory function can directly and indirectly improve or impair the level of actual memory performance.

Two key concepts reside in Bandura's self-efficacy construct: efficacy expectations and outcome expectancies. An efficacy expectation is defined as "the conviction that one can successfully execute the behavior required to produce outcomes." An outcome expectancy is "a person's estimate that a given behavior will lead to certain outcomes" (Bandura, 1977, p.193). For example, an individual might believe that if he can jump six feet high, he will have the honor of meeting the president of his nation (outcome expectancies); however, he may have doubts about whether he could really reach the goal of jumping six feet (efficacy expectation). Accordingly, the individuals' belief in their ability to succeed in a particular activity will affect their decision about whether or not to attempt it.

In discussing dimensions of efficacy expectations, Bandura (1977, 1997) proposed three dimensions that may affect people's performance. First, efficacy expectations differ in *level*. Every individual has a very personal concept of self-judgment for a given task. For example, some people may only manage simpler tasks, whereas others may attempt to handle challenging conditions. The second dimension is *generality*. Some people may perceive themselves as being more efficacious only in a certain domain of functioning, whereas some may hold efficacious judgments across a variety of different tasks. Last, perceived self-efficacy varies in *strength*. The stronger the person's belief of his or her capability in managing the task, the more likely the person is to persevere in his or her efforts toward the task. Based on these dimensions, researchers have developed a specific research methodology to measure both the level and the strength of self-efficacy judgment (Bandura, Adams, Hardy, & Howells, 1980).

According to this methodology, the researcher identifies a series of specific tasks and ranks them from the least difficult to the most difficult. Then the research participants rate their strength (confidence) for each level (Bandura, 2006; Bandura, et al., 1980,). The total number of tasks that the individual believes he or she can perform is represented as self-efficacy level, whereas self-efficacy strength represents the average of the confidence ratings that he or she assigns to each task.

Self-efficacy is derived from four major sources that influence people's task performance (Bandura, 1977, 1997). The first source is defined as *mastery or enactive experiences*, which refer to direct evidence that the individual has been capable of performing a certain task. Mastery experiences have been demonstrated to be the strongest source of efficacy belief. Next, *vicarious experience* refers to how a person

might learn from others who demonstrate that the task is manageable. Observations of successful others raise the chance of success; in contrast, unsuccessful demonstrations are likely to decrease motivations. Third, a person's efficacy beliefs can be reinforced by *social persuasion*, which can persuade individuals that a task can be successfully completed. The last source is from one's *personal physiological or emotional state*: people in a depressed state are unlikely to bolster their self-efficacy. Cultural dimensions may influence any or all of these sources of efficacy beliefs. For example, Taiwanese elders perceive "companionship" as a motivator for engaging in health promotion activities (Chen, 2003). Thus, adapting either "vicarious experience" or "social persuasion" can play an important role in studying the memory patterns of elderly Taiwanese, because persons might look to their friends for memory modeling information or might attend closely to their friends' verbal feedbacks.

According to Bandura (1989, 1997), memory function in older adults is influenced by several factors, including perceptions about the nature of memory, physical ailment, societal attitudes of age stereotypes, and major changes in life situation. He further claims that how individuals perceive memory also influences over their beliefs about their own memory performance. For example, if people believe their memory ability is likely to decline inevitably with the biological aging process, they are unlikely to spend time and exert an effort to improve that ability. If individuals regard memory as a cognitive skill that they are able to change, they are likely to strive to improve their memory ability. Thus, Bandura believes "efficacy beliefs can enhance memory performance by motivating deeper levels of cognitive processing of experiences" (1997, p. 203). Indeed, an individual's beliefs about memory process may influence his or her

memory performance and, as a result, deserves systematic investigations in Taiwanese older adults.

In regard to the domain of memory, the term "memory self-efficacy" was developed and defined by researchers. Memory self-efficacy refers to a personal judgment about one's ability to perform a given memory task with competence and confidence (West & Berry, 1994). As delineated by these authors, the definition and measurement of memory self-efficacy are derived directly from Bandura's concept of self-efficacy. Memory self-efficacy has been defined as a self-evaluative system of beliefs in one's capacity to use memory effectively in a domain of function (McDougall, 2004). McDougall demonstrates the association of memory self-efficacy with memory performance as well as the use of memory strategies.

Hypothesized Relationships

The conceptual framework set forth in this research proposed an interrelationship among demographics, metamemory, memory self-efficacy and memory performance in Taiwanese older adults (Figure 1.). Studies on age and memory reveals that the greater the individual's age, the less memory performance he or she has (Cutler & Grams, 1988; West, Welch, & Knabb, 2002; Zelinski, Gilewski, & Schaie, 1993; Zelinski & Stewart, 1998). Additionally, as individuals grow older, they are likely to perceive their memory is subject to long time change (McDougall, 2004). However, other studies have failed to find age differences in memory performance (Neupert & McDonald-Miszczak, 2004).

Studies on gender differences in memory and aging indicate that women were more accurate than men in performance of recall or recognition tasks (Hultsch, Hertzog,

& Dixon, 1990; Nilsson & Larsson, 2007; Zelinski & Stewart, 1998). Further, research findings indicated that women reported their memories as better than the men surveyed (McDougall, 1998; Nilsson & Larsson, 2007; West et al., 2002). In contrast, a study of clients aged 55 or older revealed that women frequently or sometimes have more trouble remembering things than men do (Cutler & Grams, 1988). Women did not perform as well as men did on a variety of memory tasks (Suen, 2000). Nevertheless, researchers did not find gender differences in the measurement of subjective memory (McDougall, 1998).

Education attainment has a profound impact on an individual's memory. For example, older adults with less education tend to perceive having frequent memory failures (Cutler & Grams, 1988; Perlmutter, 1978). Additionally, education has been significantly correlated with metamemory and memory performance, suggesting that those who had the higher level of education tend to use more memory strategy, and have greater memory knowledge and better memory performance (McDougall, 2004; McDougall, Vaughan, Acee, & Becker, 2007). Moreover, education level has been positively correlated with metamemory in older people with multiple sclerosis (Randolph, Arnett, & Higginson, 2001).

The relationship between health and memory is reciprocal. Research literature suggests that individuals who perceive that their health is better tend to have greater memory capacity, more stable memory and less anxiety in memory-demanding tasks (Ponds & Jolles, 1996). Older adults' health status, therefore, may influence their beliefs on memory functioning. Researchers found that self-ratings of health accounted for 17% of the variance in self-assessed memory (Gilewski, Zelinski, & Schaie, 1990). Older

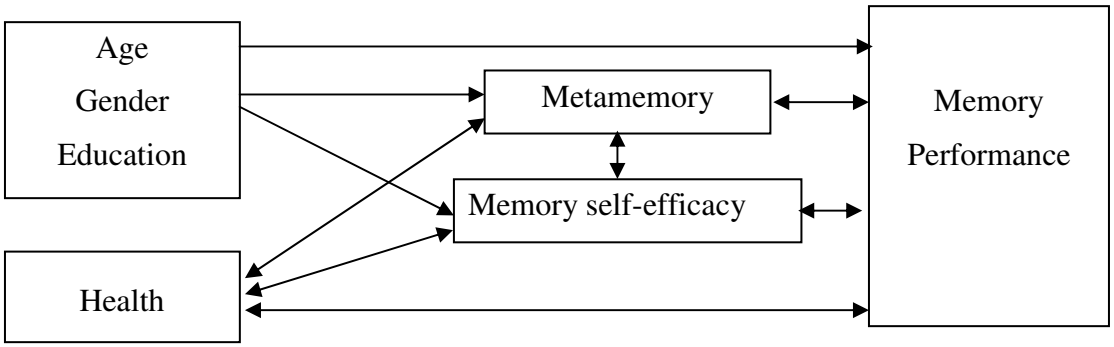
adults perceiving that their health has decreased tend to believe that they remember less in their everyday experiences (Cutler & Grams, 1988), that their memory is not as good as it was, and that they are less in control of their memory (McDougall, 1994).

Earlier literature examining the relationship between metamemory and memory performance demonstrates age differences within this relation (Bruce, Coyne, & Botwinick, 1982; Cavanaugh, 1986; Cavanaugh & Green, 1990; Dixon & Hultsch, 1983a; Hertzog et al., 1990b; Herzog & Rodgers, 1989). It appears that young adults were accurate or had underestimated predictions for their future performance, whereas older adults generally tended to overestimate performance. Rather than comparing metamemory in young and old adults, recent studies have focused more on older adults' metamemory or/and their memory performance in order to promote their mental health and cognitive function (McDougall, 1994; McDougall & Holston, 2003; McDougall & Kang, 2003). Given the lifelong learning movement, many older adults are eager to take classes to enhance self-improvement. Investigation of their metamemory will not only help researchers gain better insights into this phenomenon, but will also provide older adults with better knowledge of how memory works and what strategies are more effective in learning.

Although age differences in favor of the young in both self-efficacy and memory performance have been established (Hultsch, Hertzog, Dixon, & Davidson, 1988; Luszcz, 1993; West et al., 2002), many studies have also shown correlations between memory self-efficacy and memory performance in older adults (Hertzog et al., 1990b; Neupert & McDonald-Miszczak, 2004; Seeman, McAvay, Merrill, & Albert, 1996; West & Yassuda, 2004). According to Bandura (1997), people often view their memory

performance as an indicator of their cognitive capabilities; therefore, if older adults believe less about their memory capabilities, they are less likely to use their cognitive ability. Thus, research on the effect of efficacy belief on memory in older adults carries special importance.

Figure 1: Conceptual framework



Research Questions

This study included the following research questions:

1. What are the distinguishing characteristics of the demographics, health, metamemory, memory self-efficacy and memory performance of Taiwanese older adults?
2. What are the gender differences in metamemory, memory self-efficacy and memory performance among Taiwanese older adults?
3. What are the relationships among demographics, metamemory, memory self-efficacy and memory performance among Taiwanese older adults?
4. What factors predict memory performance among Taiwanese older adults while controlling for age, education, health?

Hypothesis 1: Metamemory is positively correlated with memory performance in Taiwanese older adults.

Hypothesis 2: Memory self-efficacy is positively correlated with memory performance in Taiwanese older adults.

Definitions of Terms

The operational definitions of Taiwanese older adults, health, metamemory, memory self-efficacy, and memory performance are as follows.

Taiwanese Older Adults

For the purpose of this study, older adults are defined as adult males or females, 65 years of age or older. They are community-dwelling elderly Taiwanese without serious illnesses or cognitive impairment that may impede the interview process.

Health status

Health status is defined as a self-rated general well-being in Taiwanese older adults. An individual's health status can be viewed as an integrative concept reflecting the individual's evaluation and assessment of his or her general health (Lawton, Moss, Fulcomer, & Kleban, 1982).

Metamemory

Metamemory is composed of an individual's knowledge, perceptions, and attitudes as they relate to his/her memory. Metamemory is a multidimensional domain including factual knowledge about how memory works; awareness of how an individual uses memory; an individual's attitudes in memory-demanding situations; and affective states related to or produced by memory-demanding tasks (Hultsch et al., 1988).

Memory Self-efficacy

Memory self-efficacy refers to an older adult's self-assessment about his/her ability to use memory effectively and competently in a given memory task. It is a self-evaluative system of beliefs in one's capacity to use memory effectively in a functional domain (McDougall, 2004).

Memory performance

Memory performance refers to a person's cognitive and behavioral responses to his/her memory-demanding tasks. These tasks will measure the type of memory used in everyday activities because it has more practical applications in the individual's environment.

Assumptions

This study was based on the following assumptions:

1. Taiwanese older adults will demonstrate a willingness to participate in this study.
2. The participants will understand the tools provided to them, and they will respond honestly to all inquires.
3. Subjective evaluation of memory will require considerable patience on the part of participants.
4. Collection of data through objective evaluation will accurately reflect the study group's memory performance.
5. Metamemory and memory self-efficacy in Eastern culture determined in this study may vary from those perceived in Western culture.
6. Memory performance in Taiwanese older adults may display a pattern which is inconsistent with Western societies.

Limitations

1. The non-probability sample of the proposed study limited generalizibility.
2. The cross-sectional, correlational design of the proposed study limited the ability to infer causality.
3. The ranges of cognitive scores were limited to individuals without dementia since the participants needed to score 8 or higher in a brief cognitive test measured by the Short Portable Mental Status Questionnaire (SPMSQ).
4. The findings may reflect a response bias among those in the volunteer sample who are interested in the study topic of memory.

5. Measures used here and developed in a Western culture may not be culturally appropriate for Taiwanese elders.

Summary

Metamemory, defined as one's self-reported knowledge and beliefs concerning one's memory ability, has been researched extensively in Western culture. Researchers have typically found modest correlations between self-reported memory and memory performance, indicating that individuals' self-reports may not necessarily correspond with their actual memory performance. This lack of association may be influenced by one aspect of metamemory: memory self-efficacy. Given that most studies regarding memory in older adults are conducted in Western countries, there is an urgent need to investigate Taiwanese older adults' metamemory perception and memory performance in order to provide them with appropriate programs to enhance their quality of life. Additionally, the successful completion of this research offers new information to the healthcare professionals in Taiwan, which ultimately enhance their gerontological nursing knowledge.

Chapter 2: Literature Review

Initial interest in metamemory raised the concept that if an individual acquires increased knowledge about how memory works or what strategies to chose, he/she could be expected to perform better in memory tasks. Thus, an individual's memory performance depends on one's metamemory knowledge (Flavell & Wellman, 1977; Schneider, 1985). Strong correlations between metamemory measures and performance in memory tasks are then expected. This chapter provides both historic and current evaluations of the literature on subjective and objective memory. First, a brief introduction of metacognition, which serves as an umbrella in discussing the subjective memory termed metamemory, will be provided. Next follows literature concerning metamemory. Several notions related to metamemory including age-related differences in metamemory, memory monitoring, memory self-efficacy, memory complaints, newer directions in metamemory, and everyday memory are discussed. Finally, this literature review concludes with a discussion of objective evaluation of memory performance including aging and memory, procession speed, episodic memory, semantic memory, spatial memory, and prospective memory. Because research often mingles both metamemory and performance, both concepts will be discussed together.

Subjective Evaluation of Memory

Metacognition

Metacognition is often defined as "cognition about cognition." It refers to higher order thinking in which an individual is actively in control of mental processes during

learning situations (Brown, 1987; Flavell, 1979). Metacognitive functioning consists of knowledge and experiences of cognitive activities (Flavell, 1987). Metacognitive knowledge refers to acquired knowledge the individual knows about the task, about strategies, or about his own cognitive abilities. For example, the individual may be aware that he/she will be more productive by studying in a library which is a less distractive place compared to home, or he/she may be aware that more time is needed to prepare for a science test than a history test. Metacognitive experiences involve the process that regulates cognitive activities while engaged in a learning task. Thus, planning how to approach a given learning task, monitoring the understanding of the content, and evaluating the progress toward the completion of a task constitutes one's metacognitive experience. For example, if the cognitive goal of a student is to comprehend a reading text, he/she may use self-questioning, a common monitoring strategy, to test the level of understanding. If he/she is unable to answer the questions then he/she must determine the next step required to solve this problem. Consequently, he/she does so by seeking assistance from a friend or a teacher. Flavell (1971, 1977) who is regarded as a foundational researcher in metacognition, based his observations on child development and learning. This inspired him to study metacognitive activities and development. By understanding the relationships between the two, students can be taught to apply their cognitive resources more efficiently through metacognitive control. Metacognition is of importance because our knowledge about our cognitive processes can guide us in arranging circumstances and selecting strategies to improve future cognitive performance (Flavell & Wellman, 1977).

Another useful way of thinking about metacognition is proposed by Nelson and

Narens (1990). They proposed a theoretical framework to explain how cognition plays an important role during the learning stages of acquisition, retention, retrieval, and their interrelationships. Thus, cognitive processes are created between the cognitive level (object-level) and the metacognitive level (meta-level). The cognitive level includes the components of information processing: encoding, rehearsing, retrieving etc. The metacognitive level contains the supervision of activities that occur in the cognitive level (Koriat & Helstrup, 2007). For example, as the older adult is learning a new language, he/she may employ cognitive processes such as reading the text and devising the strategies used to remember the content. At the same time, he/she also engages in metacognitive processes that are monitoring and regulating these cognitive activities. In the same example, the older adult would assess whether the strategies are effective in learning the new language.

Two mechanisms flow information between the cognitive and metacognitive levels: monitoring and control (Nelson & Narens, 1990). Monitoring implies that the metacognitive level is kept informed by the cognitive level. The primary method which clarifies one's monitoring is from one's "subjective reports about his or her introspections" (p. 127). In this case, the older adult must assess the degree to which the material is mastered in order to decide whether he/she requires more time to study, or knows the content has been learned. Control means that the metacognitive level modifies the cognitive level which could lead to the initiation of an action, or continuance of an action, or could terminate an action. In the same example, the older adult needs to choose how much time to allocate to the different parts of the content, what parts need more practice and what strategies to use. In a typical memory task, the mechanism of

monitoring and control help people to process methods of acquisition (learning), retention, and retrieval (performance) (Hertzog & Hultsch, 2000). In other words, "monitoring involves the assessment of the registration of an item in memory while control entails the manipulation of this to achieve optimum performance" (Souchay & Isingrini, 2004b, p.89).

Metamemory

Flavell and Wellman (1977) viewed metamemory as the individual's knowledge about one's own or others' memory-processing capabilities, knowledge about the demand of a particular memory task, and knowledge of the strategies appropriate to specific tasks. Thus, metamemory is more than just a memory which is defined as the mental capacity to restore, retrieve or recall the past experience (Webster's Unabridged Dictionary, 1998). Besides metamemory's general usefulness in understanding people's memory knowledge in a variety of memory situations, it serves another important role, that of predicting memory behavior (Schneider, 1985). Many investigators of memory have been attracted by the possibility of predicting and explaining memory performance, which stimulated empirical research. Metamemory, a subset of metacognition, is important because it influences the organization, guidance, and monitoring of memory processes (Flavell, 1987; Flavell & Wellman, 1977).

Originally, children were the focus of metamemory research, because that focus helped explain age-related differences in memory performance (Brown, 1987; Flavell, 1977). It was believed that improvement in children's memory performance can be explained in part due to their increasing knowledge about the functioning of their own

memory systems. Following the trend in studying metamemory in children, developmental psychology researchers believed that metacognitive knowledge increases throughout life; hence they came to regard it as a natural way to study memory in older adults.

As a pioneer researcher in metamemory and aging, Perlmutter (1978), examined memory knowledge with a 60-item questionnaire that measured the individual's thoughts about his or her memory (e.g., whether it is easier to recall an abstract or concrete noun). She found no significant age differences in understanding a variety of memory knowledge. She further claimed that "they thought it easiest to remember related, organized, interesting, understandable, concrete materials" (p. 336). Another source of information of memory knowledge is the Task subscale of the Metamemory in Adulthood instrument (MIA). It contains questions related to the statements of memory knowledge which are stated as possible facts (e.g., most people find it easier to remember visual things than verbal things). It was found to have association with age in some studies (Dixon, Hertzog, & Hultsch, 1986; Dixon & Hultsch, 1983a), but no association was found in age difference in other samples (Hultsch, Hertzog, & Dixon, 1987; Loewen, Shaw, & Craik, 1990).

Arguably, younger participants in memory studies are often college undergraduates and they may have acquired superior memory knowledge from experiences of psychology class or other cognitive classes rather than the developmental loss of knowledge by older adults (Hertzog & Hultsch, 2000). However, this line of research has suggested that age-related changes in basic memory processes may provide one contributing factor toward the observed memory decline in the elderly population.

Memory performance of individuals may not only be influenced by their actual capabilities but also by their knowledge or perception of memory (Hultsch, Hertzog, Dixon, & Davidson, 1988).

Metamemory has both a developmental and clinical history (McDougall & Balyer, 1998). The developmental perspective examines information about the memory system, including the individual's knowledge, beliefs, and perceptions about memory function. The clinical perspective, on the other hand, emphasizes problems with memory (e.g., the frequency of forgetting in specific circumstances) and memory failures (e.g., less use of the most effective strategies for remembering). Indeed, it is well-accepted that metamemory is a multidimensional domain (Hertzog, Dixon, & Hultsch, 1990a; Hertzog et al., 1990b), and could be defined as "systemic awareness" (Cavanaugh, 1989). The concept suggested by the term metamemory is even more complex than that in the perspectives of developmental psychology. Hultsch, Hertzog, Dixon, and Davidson (1988) identified four broad aspects of metamemory: (a) *memory knowledge* - factual knowledge about both how memory functions and the viability of strategies for approaching tasks requiring memory processes; examples include knowing that recognition tasks are typically easier than recall tasks, and that memory strategies such as rehearsal or organization improve performance; (b) *memory monitoring* - awareness of how an individual typically uses memory and the current state of one's memory system; examples of this aspect include feeling-of-knowing judgments and evaluations of the accuracy of one's performance; (c) *memory self-efficacy* - an individual's belief in his ability to use memory effectively in memory-demanding situations, such as beliefs about one's memory capacity, how much one's memory has changed, and the degree to which

memory performance is under personal control; and (d) *memory-related affect* - affective states that may be related to or generated by memory-demanding situations, including depression, anxiety and fatigue. Memory knowledge and memory monitoring are the main focus of early work on metamemory, whereas memory self-efficacy and memory-related affect are important in understanding the individual's metamemory across adulthood (Hertzog et al., 1990a).

Development and Measurement in Metamemory

The construct of metamemory is broad, and how one can not only measure the essence of metamemory but also use sound psychometric properties has remained a challenge to researchers. Efforts have been made by investigators to develop instruments that uncover the dimensions of metamemory. Self-report was a primary method of studying metamemory (Lovelace, 1990). Although many researchers have used questionnaires of unknown reliability or validity, several have devised systematic questionnaires to test for evidences of validity and reliability (Gilewski & Zelinski, 1986). Most notable in this regard are the Inventory of Memory Experiences (IME) by Herman and Neisser (1978) (Hermann & Neisser, 1978), Memory Functioning Questionnaire (MFQ) by Gilewski and Zelinski (1988), and the Metamemory in Adulthood instrument (MIA) by Dixon and Hultsch (1983a, 1983b). With these questionnaires, metamemory has been investigated empirically, and our understanding of this construct has also been advanced.

There is a substantial body of research employing the MIA instrument by its developers (Dixon et al., 1986; Dixon & Hultsch, 1983a, 1983b; Dixon, Hultsch, &

Hertzog, 1988; Hertzog et al., 1990a, 1990b; Hertzog et al., 1987; Hultsch, Dixon, & Hertzog, 1985; Hultsch et al., 1987). From factor analysis of large sets of data, these researchers identified seven subscales or dimensions of metamemory being tapped by the items on this questionnaire. These subscales are labeled Achievement (the perceived importance of performing well on memory tasks), Anxiety (the state of stress in performing memory tasks), Capacity (prediction of memory performance), Change (perception of susceptibility of memory to long-term decline), Locus (perceived personal control over memory ability), Strategy (knowledge and use of information about one's remembering ability), and Task (basic memory processes and how most people would perform).

Among these subscales, two higher order factors are formed to illustrate more thoroughly the construct of metamemory (Hertzog et al., 1987). The first one is Memory Knowledge which consists of Strategy, Task, Achievement and Anxiety. The other factor, named Memory Self-efficacy, includes Capacity, Change, and Locus. It has been found that the higher-order labeled "Memory Knowledge" is not affected by age. On the other hand, "Memory Self-efficacy" demonstrated significant age differences (Dixon, Hultsch, Hertzog, & Davidson, 1988). Older adults perceived themselves as having less memory capacity, less memory stability, and less control over their memory.

Age-related differences in adults' perceptions of their memory system have been investigated. Dixon and Hultsch (1983b) examined metamemory in adulthood across three samples (N = 120, N = 108, N = 150). They found that older adults had significantly less memory knowledge, declining memory, less memory capacity, and less control over their memory than younger adults. Similar findings were reported in adults

with ages ranging from 20 to 78 years (N = 775) (Hultsch, Hertzog, & Dixon, 1987). They found that older adults viewed themselves as having memory decline over years, less memory capacity, less control over their memory, and less strategy use than younger adults. Likewise, the comparison of metamemory in younger adults (N = 58) and older adults (N = 55) showed that there was no age difference in knowledge of memory (Loewen, Shaw, & Craik, 1990). Older adults had less memory capacity and more use of planning strategy than younger counterparts.

Age Differences in Metamemory and Memory Performance

Zelinski, Gliewski, & Thompsin (1980) examined self-perceived memory and laboratory tasks (e.g., list recall, prose recall) in young adults (n = 123) and older adults (n = 73). They found that older adults experienced more memory failures than younger adults. However, older adults' evaluation of their memory was more accurate than younger adults. The authors suggested that healthy, non-institutionalized older adults were aware of their own memory problems.

Metamemory and text recall in adulthood were studied within three samples (N = 60, N = 108, N = 150) (Dixon & Hultsch, 1983a). Results indicated that metamemory subscales were significantly correlated with performance among the three samples (r = .28-.47 for sample 1; r = .23 - .38 for sample 2; r = .23 - .47 for sample 3). The authors reported that memory knowledge, motivation to achieve good memory, and having control over memory were the predictors for older adults. On the other hand, younger adults' performance was predicted by what they knew about retrieval strategies and external reminders, their perception of memory capacity, and their understanding of

memory tasks and processes.

Cavanaugh and Poon (1989) investigated the age-related differences in the relationship between the two metamemory questionnaires, and free- and prose-recall performance. Younger adults with a mean age of 20.2 years (n = 100) and older adults with a mean age of 68.4 years (n = 100) participated in this study. Younger persons reported as remembering better on names and rote memory than older adults. Moreover, younger adults had greater use of memory strategies, better memory capacity and stability, and greater control than their older counterparts. In memory performance, younger adults generally performed better on most tasks than older persons. Locus of control and stability of memory were the important predictors for older adults, whereas the use of strategy predicted younger persons' memory performance. These authors suggested that the type of tasks influences the metamemory-performance relationship. It seemed that more meaningful tasks such as prose recall were better predicted than the traditional laboratory tasks (e.g., list recall).

Metamemory and memory performance have been researched in adults within three age categories: 55-64, 65-74, 75-89 (Jonker et al., 1997). Younger groups had a higher locus of control of memory. Women reported less control over their memory and tended to have greater anxiety than men. Women's memory performance was predicted by their level of motivation to achieve a memory task and the state of anxiety in memory-demanding situations. The authors of this research concluded that the testing environment and the preparation for the test influenced older persons' memory performance. Affect-related factors, such as achievement and anxiety, appeared to be the important predictors for older persons who took memory tests at home, and were not prepared for the tests in

advance,

Reese and Cherry (2006) investigated metamemory and its relationship with memory performance between younger adults (M = 20.8, SD = 3.5) and older adults (M = 65.8, SD = 6.0). Younger adults perceived everyday cases of forgetting as more serious than older adults. Younger adults also indicated that their current memory functioning was better than when they were younger, whereas older adults reported their current memory functioning had worsened. Participants with less education perceived the frequency of forgetting everyday activities was more serious than those with higher education. Adults with less education also reported less use of mnemonics than those with more education. Subjective memory evaluations were largely unrelated to objective memory performance. However, adults who forgot less in their daily lives tended to have better memory performance (r = .34, p < .01).

Age Differences in Memory Monitoring

One critical component of metacognition is the individual's awareness of how memory works, as opposed to judgments of one's own current memory status for particular tasks (Hertzog & Hultsch, 2000; Lovelace, 1990). In the case of monitoring learning, a common procedure termed global predictions is to give research participants a list of words and ask how many words they can recall later, followed by a prediction of performance (the difference between the predicted and correct words). Another type of prediction is an item-level prediction which is called Judgment of Learning (JOL). This method is to ask participants to rate their relative confidence that a particular item will be recalled by them at a later point of time. In judgment of learning, a participant might be given a list of paired terms, then he is asked to study an item (e.g., FISH-TABLE). After

study, he would be asked to rate his confidence (on a 0%-to-100% scale) that he will recall the paired word when presented with a test with the cued word (e.g., FISH-???). In terms of the types of monitoring, the most often used in research are Judgments of Learning (JOL) and Feeling-Of-Knowing (FOK). FOK is usually conducted after the task performance. The participants will be asked to judge whether a given currently non-recallable item is known and/or will be remembered on the subsequent test. This line of research usually investigates whether or not there are age differences in the accuracy of performance predictions.

Early literature indicated that there were no age differences in memory monitoring. In researching memory monitoring of world knowledge using Feeling-of-Know (FOK) among young (*M* age = 20.58), middle-aged (*M* = 49.92), and older groups (*M* = 68.92), no age differences were found (Lachman, Lachman, & Thronesbert, 1979). Older adults performed better than younger groups in memory performance measured by correct recall. Likewise, Lovelace and Marsh (1985) had the young adults (*M* age = 18.9) and older adults (*M* age = 66.9) learn 60 pairs of words through self-paced study. Their task was to associate the two words, and later when the first words of the 60 pairs appeared, they were asked to identify the second words in a second list. There were no age differences in monitoring ability (*M* = .88, *SD* = .30; *M* = .83, *SD* = .44). However, young adults performed better than older adults in the matching task, having more correct pairings. The authors claimed that older persons underestimated task difficulty because they overestimated the number of correct matches they would make.

Shaw and Craik (1989) investigated the effects of different cues on 18 young (*M* age = 19.4) and 18 old (*M* age= 68.7) adults' memory performance. Sixty common and

concrete words were presented to participants who were to rate each word for the likelihood of success in later recalling that word. Each word was presented with one of three types of cues meant to influence the type of encoding for processing that item. For 20 of the words, the encoding cues were letter cues (e.g., "start with ic: ice); for 20, rhymes (e.g., "rhymes with nice: ice"); and for the remaining 20 categories (e.g., "something slippery: ice"). These same cues later served as recall cues. Results revealed that there was no age difference in monitoring ability but the young adults performed better than the older adults in actual performance. Both young and old participants showed substantial differences in recall performances when presented with different types of recall cues. Participants of both age groups showed an average recall rate of 30% when presented with a letter cue, and recall rates of 55% and 80% for rhyme and category cues respectively. These results demonstrated an increase in performance when subjects used deeper levels of processing (e.g. category cues in this study), and that increased semantic guidance (e.g. category cues) resulted in reduced age differences.

Researchers investigated metamemory abilities with the levels of difficulty in memorizing words among three age groups (*M* age = 24.8, 64.96, 76.46) (Bruce et al., 1982). The memory tasks were to learn low- and high- imagery (i.e., freedom-clown) and low- and high-frequency (i.e., flapjack-money) words and to make predictions on their consequent performance. There were no age differences in the prediction of the number of words among these three groups, but younger adults recalled better than other groups. Two elderly groups tended to overestimate their recall ability. The authors concluded that metamemory monitoring declines with age.

In terms of metamemory and strategy use, Murphy, Sanders, Gabriesheski, and

Schmitt (1981) devised two procedures to study memory monitoring in young (*M* age = 20.2) and old (*M* age = 69.1) adults. Their results indicated that there were age differences in study time in a serial recall task. Young adults performed better because they took longer to study the items, whereas older adults were less aware of readiness to recall and hence did not select an optimal study time. The authors attributed the age difference in strategy use to age-related memory monitoring deficiency. Older people may use less efficient strategies for memory tasks, thus producing age differences in memory performance (Perlmutter, 1978). Similarly, Brigham and Pressley's (1988) study found that older adults seemed to be less aware of their metamemory ability, thus resulting in the selection of poor strategies. Moreover, Bieman-Copeland and Charness (1994) developed two trials of recall prediction in young (*M* = 19.6) and old (*M* = 68.2) adults to determine whether participants would improve in their second prediction accuracy after the first monitoring experience. The authors reported that although those two groups improved their accuracy in the second recall predictions, younger adults were able to differentiate the effectiveness of the cues, which enabled them to modify their predictions.

Souchay, Insingrini, and Espagnet (2000) investigated the relationship between aging, Feeling-Of-Knowing (FOK), and episodic memory. Forty one older adults (*M* = 72.04, *SD* = 10.20) and 20 younger adults (*M* = 24.25, *SD* = 3.29) participated in metamemory, episodic memory, and neuropsychological assessments. Older adults scored significantly lower in all assessments than younger adults ($p < .001$). Older adults were also less accurate in estimating their ability to recognize newly learned tasks. The authors concluded that as individuals grow older, their memory monitoring is less

accurate. This decline was associated with a degradation of the executive functions of the brain.

Age-related differences in the relation between monitoring and control of learning have been studied (Souchay & Isingrini, 2004a). Younger adults (n = 23) recalled more items than older adults (n = 24), however, both groups were able to allocate more study time to the unrecalled items. Older adults did not adjust their study time as adequately, based on their performance, as did younger adults. Likewise, older adults did not use monitoring to allocate study time as acceptably as younger adults. The authors concluded that there was an age-related change in monitoring memory performance.

Some studies found that older adults overestimate their memory performance (Brigham & Pressley, 1988; Bruce et al., 1982; Lovelace & Marsh, 1985; Murphy et al., 1981). On the other hand, several studies have found relatively accurate memory task predictions by older adults (Hertzog et al., 1990b; Lachman, Steinberg, & Trotter, 1987; Perlmutter, 1978). In regard to most prediction studies, an implicit assumption is that "prediction accuracy is determined by both (a) accuracy of declarative knowledge about one's own memory system, and (b) the degree of awareness of current status of information held in memory" (Hertzog, Dixon, & Hultsch, 1990a, p. 171). Although some parts of memory systems may decline with increasing age, self-evaluation of memory in older adults remains a critical domain for continuing investigation, because it reflects older persons' perception of their memory and raises awareness about their memory.

In summary, self-report indices of metamemory have not been found to show a strong relationship to objective performance, showing only modest correlations (Hultsch

& Hertzog, 2000; Lovelace, 1990). Several researchers have argued that there is considerable interest in the perception held by the elderly about any changes in memory function. Even if they do not represent estimates of performance, these perceptions may have an impact on the choices made by the elderly about how they will perform the memory tasks (Hultsch et al., 1987). Because other factors may explain the relation between metamemory and memory performance, cognitive aging researchers for the past 30 years have been attracted to investigating those factors. Memory self-efficacy has also received a great deal of attention.

Memory Self-Efficacy / Beliefs

In this project, memory self-efficacy also refers to memory beliefs and efficacy beliefs. The individuals' memory beliefs, in addition to their knowledge of and attitudes about memory, may direct a person's cognitive resources during task performance (Cavanaugh & Green, 1990; Herrmann, Grubs, Sigmundi, & Grueneich, 1986). Early researchers focused mainly on the concept which they labeled memory self-efficacy in their efforts to document memory beliefs. The authors emphasized the importance of differentiating knowledge about memory mechanisms and processes from beliefs about one's memory ability (Hertzog et al., 1990a). For example, an older adult may have accurate knowledge about memory functions but may believe he/she may fail in specific tasks of memory performance. The critical feature that differentiates these two notions is *personal agency,* which refers to a person's effective use of memory (Cavanaugh, Feldman, & Hertzog, 1998). Presumably, people with greater memory knowledge are more likely to have better memory performance and/or greater memory self-efficacy, but

this is not always true. Cavanaugh and colleagues (1998) proposed two advantages in differentiating memory knowledge from memory beliefs. First, there is the possibility of allowing different directions that simultaneously appear in the two concepts. For instance, a person may know some strategies are effective in improving his/her memory functions but believes himself/herself incapable of utilizing those strategies. Next, the concept of memory beliefs helps to relate memory complaints and memory self-ratings, since both exist under the same belief about the self as a rememberer. This argument is evidenced in literature indicating that the frequency of forgetting and rating of one's memory share the strong convergent validity (Hertzog, Hultsch, & Dixon, 1989).

Berry and colleagues (1989) posit that memory self-efficacy (MSE) is the combination of competence and confidence for a given memory task. The notion of memory self-efficacy is related more to a task-specific concept than to a global one. Berry and West (1993) stated that self-efficacy "is *not* a global self-evaluation but instead, is quite tied to particular task demands and characteristics of a given situation. Neither is one's self-efficacy a static, fixed entity; rather, it is dynamic and malleable, subject to changes in task demands, situational determinants, social context, and individual development" (p. 353). According to the authors, their definition and measurement of memory self-efficacy is derived directly from Bandura's concept of self-efficacy. Indeed, their measure of memory efficacy, the Memory Self-Efficacy Questionnaire (MSEQ), is substantially distinctive from other memory self-efficacy researchers in terms of methodology. The aim of MSEQ is to evaluate personal judgment on a specific memory task (e.g., remembering names, grocery, directions). The approach of MSEQ is based on hierarchical arrangement of subtask levels that span from low to

high levels of achieving a task goal. MESQ contains 10 tasks and each task ranks in 5 different levels, resulting in a 50–item questionnaire (Berry, 1999; Berry et al., 1989). Respondents answer YES or NO for each task level and 10-100% for confidence ratings. If the respondent reported No for a task level, he/she will be scored as 0 % confidence. Memory self-efficacy has been found to significantly predict memory performance (Berry & West, 1993).

Another measurement of memory self-efficacy was derived from factor-analytical scales composed of items from Metamemory in Adulthood (MIA) (Dixon et al., 1988) and the Memory Functioning Questionnaire (MFQ) (Gilewski & Zelinski, 1988; Gilewski et al., 1990; Zelinski, Gilewski, & Anthony-Bergstone, 1990). Both groups of researchers emphasize the individual's self-beliefs about his/her memory capacity and forgetting. Berry (1999) concluded that the biggest difference between memory self-efficacy in the MSEQ and the MIA is that "MSEQ items assess self-confidence in one's ability to perform specific memory tasks, whereas MIA items assess self-evaluations of one's general competence or ability across many different memory domains and tasks" (p.73).

These measures of memory self-efficacy have been scrutinized extensively for their psychometric properties. Results found substantial evidence of high internal consistency for all subscales in MIA and MFQ as well as construct, convergent and discriminant validity (Dixon et al., 1988; Gilewski et al., 1990; Hertzog et al., 1987). However, their predictive validity to memory performance is generally low-to-moderate (Berry & West, 1993; Cavanaugh & Perlmutter, 1982; Hertzog et al., 1990a, 1990b). Self-report is the primary measure of memory self-efficacy. Although concerns about the

quality of self-report measures have been well discussed (Dixon, 1989; Herrmann, 1982), it is noteworthy to examine two types of questions related to memory beliefs: frequency estimation and ability-quality judgment (Cavanaugh et al., 1998). The way respondents construct their answers to frequency estimation is usually through one of the three cognitive strategies. These cognitive methods are availability, accessibility and representativeness. Availability refers to information that can be retrieved in a facile manner in order to frame the response. In the accessibility strategy, the respondent relies only on information which he/she can access easily. To apply representativeness, the person is able to associate information from the question with an event or a fact that has specific connection to his/her own experience. In addition, the frequency response scale (i.e., always, often, sometimes, rarely) may influence the interpretation of the results because the respondent's understanding of the response scale may differ individually.

The second category of memory belief questions is those which rate memory ability or memory quality. Specifically, if the individual is unfamiliar with the question as it is phrased, he/she is likely to find that judgments are either inaccessible or unavailable. If the respondent is familiar with a question or sees a pattern in the questioning, he/she is likely to sue the representativeness strategy. However, the way in which this strategy is implemented depends upon the nature of question. For example, if a respondent has been asked a similar question before, then he/she would retrieve the answer from the previous experience. Otherwise, the respondent may apply the representativeness strategy. For example, the questions "How well do you remember names?" and "How well do you remember historical facts?" may result in unique applications of the strategy. Names may

be represented from direct personal experience, whereas historical facts are apt to be represented through a more abstract series of personal connections.

Thus, the authors claimed that measures of memory beliefs need to take into account the type of question and the context in which it is offered to the respondent. Furthermore, in order to grasp the significance of response, the study insists that several cognitive strategies are used by participants.

Research on memory self-efficacy in adulthood has primarily focused on age differences. Strong evidence indicates that older adults have decreased memory self-efficacy when compared to younger adults. This phenomenon has been obtained across varied assessment techniques, including single item self-efficacy predictions for digit and word recall (Rebok & Balcerak, 1989), metamemory self-efficacy (Cavanaugh & Poon, 1989; Hertzog et al., 1990b; Luszcz, 1993), and task-specific measures of self-efficacy (Desrichard & Kopetz, 2005; Gardiner, Luszcz, & Bryan, 1997; West & Berry, 1994; West, Dennehy-Basile, & Norris, 1996; West et al., 2002)). Although memory efficacy decreased as people age, societal attitudes about aging may play a vital role (Hess, 2005). Therefore, the social context is interwoven within these findings.

The relationship between self-efficacy and memory performance reveals inconclusive results. Cavanaugh and Poon (1989) found that memory efficacy predicted memory performance (immediate and delayed recall of words and text) in older but not in younger adults. In contrast, Dixon and Hultsch (1983a) reported that the efficacy belief as measured by the MIA Capacity subscale was a significant predictor in younger but not in older adults' memory performance. Moreover, Dixon and colleagues (1986) reported that the memory self-efficacy, as measured by the MIA Capacity and Change subscales, was

not significantly predicted in a variety of memory performance. On the other hand, Berry and colleagues (1989) found that task-specific strength was significantly related to older adults' memory performance but not to younger adults'. Thus, Hertzog and colleagues (1990a) suggested that memory performance could best be predicted when both global (i.e., MIA) and task-specific (MESQ) measures are conducted.

Researchers have argued that cross-sectional studies on metamemory may not truly explain individuals' self-referent knowledge, perceptions, attitudes and strategy use over their memory; thus, longitudinal studies on metamemory have been analyzed. Valentijn and colleagues (2006) tested whether memory self-efficacy predicts memory performance in older adults with the baseline mean age of 66.09 (N =557) in a six-year follow-up study. This study found that the older adults' memory efficacy as measured by the MIA Change subscale was the best predictor of change in objective memory functioning after an interval of six years. Similarly, McDonald-Miszczak and colleagues (1995) reported significant changes on several subscales of the MIA in mid-to-old adults (55-86 years) who were measured three times over six years. Participants reported lower memory capacity, declining perceived memory stability, less personal control, greater memory anxiety, and greater use of external strategies. However, the effect size for these changes over the six years was relatively small (range = -.15 to .26). Interestingly, women reported their memory capacity higher than men across three times of measurement. Nevertheless, women's memory capacity declined between Time 2 and Time 3, whereas men's remained stable over six years. This pattern also appeared in participants' rating of their control of memory. According to the authors, the most prominent finding in their study was the relative stability of memory beliefs.

Another longitudinal study conducted by Zelinski and colleagues (1993) found an increase of forgetting in older adults over three years. The authors concluded that this decline was associated with advancing age. Likewise, Small and Dixon (1999) reported that the older age groups displayed a relative decline in memory performance over six years; however, this decline was relatively slow. In contrast to memory, tests of language, visuospatial ability, and abstract reasoning were preserved. Therefore, not every aspect of memory systems declined with advancing age. The decline was only found in performances sensitive to the acquisition and early retrieval of new information, and not in the measure of memory retention. The effect of longitudinal study established age-related memory decline, and indicated that this decline did not occur diffusely across multiple cognitive domains.

In sum, memory self-efficacy as an important notion of metamemory has received attention. Early research on this domain differentiates the perception of memory efficacy between younger and older adults. Although older adults have lower efficacy belief than younger adults in cross-sectional studies, older adults' efficacy belief does not decline rapidly over years. Thus, it can be expected that older adults still value their memory efficacy; nevertheless, this belief may be influenced by other factors such as societal attitudes.

Metamemory, Memory Self-Efficacy or/and Memory Performance in Older Adults

Many studies show a strong correlation between memory self-efficacy and memory performance among older adults (Hertzog et al., 1990b; Seeman, McAvay, Merrill, & Albert, 1996; West & Yassuda, 2004). Accordingly, memory intervention

programs improve both self-efficacy and memory performance, indicating that improvements in self-efficacy may lead to improvements in performance (West & Yassuda, 2004). Although most studies have not specifically tested whether improving self-efficacy alone can improve memory performance, there are a few notable exceptions that support this idea. For example, the Cognitive Behavioral Model of Everyday Memory, which emphasizes enhancing memory self-efficacy to improve performance, has been successful in changing older adults' memory efficacy beliefs about their memories (McDougall, 2000, 2002).

Two studies focused on metamemory and laboratory memory performance (e.g., list of words and text recall, word recognition) in an older population (Zelinski, Gilewski, & Anthony-Bergstone, 1990). There were 198 individuals, aged 55-85, who participated in Study 1 (M = 67.85, SD = 6.89). Frequency of forgetting was a significant predictor for most memory tasks ($p < .01$). Individuals' seriousness of forgetting also predicted word recognition tasks ($p < .05$), suggesting older adults who were serious about their memory failures perform better. In Study 2, older adults who reported memory concerns participated in this study (N = 89, M age = 70.57, SD = 2.70) to examine their subjective memory through two measures of clinical memory performance. Similar to Study 1, people who reported more frequent memory problems performed poorly on the clinical tasks (acquisition and delayed recall). The authors of this study concluded that their self-developed instrument, the Memory Functioning Questionnaire (MFQ), was a modest predictor for memory performance, accounting for by 8% - 12% of the variance in scores. They also suggested that the MFQ was useful for healthcare providers in assessing older adults' memory concerns.

In a discussion of metamemory and older adults, 169 community-dwelling elders (M = 67.94, SD = 6.30) reported their perceptions of memory (McDougall, 1994). They were divided into three age groups: young-old (age 55 to 64, n = 50); the middle-old (age 65 to 74, n = 90); and the old-old (ages 75 to 83, n = 29). The middle-old group had a significantly higher use of strategies in memory-demanding situations than the other two groups (p = .38). Moreover, findings have shown that the oldest group had significantly lower scores than the young-old group on memory efficacy level and strength. Health status and self-efficacy strength predicated metamemory subscales of Capacity, Change, Anxiety and Locus. Older adults with decreased health and the sense of efficacy believed that they remembered less in daily activities, that their memory got worse, that they were more anxious in situations requiring memory, and that they had less control over their memory.

The relationship between metamemory and performance (traditional vs. everyday tasks) in 93 community-dwelling women age 75 or older was investigated (Goodman & Zarit, 1995). Subjective memory was not significantly correlated with either traditional or everyday tasks. Similarly, memory self-evaluation in old and very old was analyzed (Perrig-Chiello, Perrig, & Stahelin, 2000). 301 healthy people aged 65-94 joined this study, in which 127 people aged greater 75 years old were categorized as the old-old group. The rest of the participants were in the young-old group. 64% of the participants rated their memory worse than in the past, 5% rated it as much worse. Old-old group experienced a greater decreased memory than young-old (p = .037). A small percentage (9%) of the participants indicated that their actual memory was worse than those in the same age. Interestingly, the old-old group had more positive memory competency than

their younger cohort. 65% of the participants rated a more pessimistic judgment of situation-specific memory.

Jennings and Darwin (2003) reported that older adults who believed high motivation, mental activity and use of routines had a positive effect on their beliefs and performance on most laboratory tasks. However, older adults reported that age was most responsible for their everyday memory performance. In discussing strategy use and performance, older adults indicated that their levels of laboratory performance were significantly better when the use of internal strategy increased ($p < .05$). In addition, internal strategies significantly correlated to everyday memory, such as the less frequent forgetting of important dates.

The perception and performance of memory in ethnic older adults has been researched (McDougall, 2004). 89 African American elders ($M = 76.33$) and 83 Caucasian older adults ($M = 76.73$) participated in a memory study, indicating that the black older adults had a significantly greater anxiety in memory-related situations than the white participants. The Black participants significantly used less strategy and less memory knowledge than the White older adults ($p < .05$). Moreover, the black participants had lower memory self-efficacy and lower memory performance than their white counterparts. Age and memory self-efficacy were the significant predictors of memory performance for all participants ($p < .01$).

The perception of memory in older males has been researched (McDougall & Kang, 2003). Metamemory, memory self-efficacy and memory performance were examined in 157 older male adults ($M = 75.49$, $SD = 8.00$). Older adults who scored higher in memory self-efficacy also had higher scores for cognition, memory

performance, memory capacity and change. On the other hand, the individuals who had lower self-efficacy tended to be older and more anxious about their memory. As the individual grew older, memory performance, memory capacity and stability decreased.

Memory self-efficacy predicted memory performance in both black and white elders (McDougall, 2004). MSE has been shown to predict memory performance in several studies with the elderly (Berry, West, & Dennehey, 1989; Best, Hamlett, & Davis, 1992; Lachman, et al., 1992, Rebok & Balacerak, 1989, Suen, et al., 2004). Memory self-efficacy for everyday tasks (map, location, phone, and grocery) predicted memory performance for everyday tasks, but not laboratory tasks such as word, picture, digit, and maze (Berry, West, & Dennehey, 1989).

Two studies were conducted to understand the relationships between subjective evaluations of memory and objective memory performance in older adults (Schmidt, Berg, & Deelman, 2001). In the first study, 117 community dwelling older persons (M = 61.6, SD = 10.2) were investigated. The correlations between subjective memory measures and objective memory performance were low with a maximum of .28. Objective memory performance containing more ecological tasks (e.g., written story or name-face test) did not indicate a greater association with subjective judgments than laboratory tasks (e.g., Digit Span: repeat strings of digits ranging from 3 to 8 digits in forward and backward positions). In the second study, consisting of 111 persons (M = 63, SD = 10.0) with memory complaints, their memory was tested with some measures from Study 1, but also with some everyday memory tasks, such as making telephone calls. As in Study 1, there were no relationships between subjective memory and types of objective memory (laboratory vs. ecological tasks). The authors concluded that self-reports are not

reliable indicators of memory performance and should be used with caution in clinical practice. In order to confirm a diagnosis, subjective memory reports should be supplemented by objective measures.

Memory Complaints as Metamemory

Under the same line of research with memory beliefs, another type of subjective memory evaluation is that of memory complaints. Older adults commonly complain about their memory. However, the onset of memory difficulties can occur as early as middle age. A study has shown that forgetfulness would increase over adulthood with an average age of onset of 55 years (Heckhausen, Dixon, & Baltes, 1989). Healthcare providers have long been interested in the accuracy of memory complaints for older adults, because older people often report memory problems in their healthcare visits (Dufouil, Fuhrer, & Alperovitch, 2005). In addition, a complaint of memory impairment may be an early symptom of a pathologic process like Alzheimer's disease. It is therefore important to determine if people's ratings of impaired memory are an accurate reflection of memory decline, or if they are caused by some other testable conditions such as dehydration, anxiety or depression.

Researchers examined memory complaint in elderly community-dwellers, aged 70 or above, from a nationwide random sample (N = 5444) (Turvey, et al., 2000). Older adults' self-rating of their memory corresponded to their overall cognitive function. Participants with depressive symptoms and daily activity impairments also tended to make statements about their impaired memory. In addition, the authors reported that a major percentage of the participants made incorrect assessments of their own memory

skills. It was important to differentiate older adults' memory complaints from depression or functional impairments.

The relationship between subjective memory complaints and cognitive decline was examined in a three-time period (baseline, 4-years, 6-years) longitudinal study of French elderly (Defouil, Fubrer, & Alperovitch, 2005). Findings indicated that the individuals who complained more about their cognitive function had experienced more cognitive decline over the preceding 4 years than other participants, even depression was controlled for. Likewise, in subjects without measured cognitive decline between the beginning of the study and the 4-year follow-up, those with more cognitive complaints at the 4-year follow-up had significantly greater measured cognitive decline during the subsequent 2 years. The authors concluded that healthcare providers should treat older adults' cognitive complaints seriously.

Wang and colleagues (2000) examined the relationship between the subjective memory complaint and cognitive performance among 543 Taiwanese older adults residing in a rural area, during a span of three years. At both time points of examinations, more than half of the participants reported having trouble with memory. Among respondents with memory complaint, they tended to be female, older age and lower education. Moreover, participants in memory complaint group scored significantly lower on cognitive performance and higher on depression than those without memory complaint at both examinations. Research findings suggested that having memory complaint did not relate to cognitive decline over the subsequent 3 years or with a diagnosis of dementia. However, subjective memory complaint was associated with objective memory abilities, which were short-term memory and long-term memory at the

time 1 and time 2, respectively. The authors concluded that although memory complaint was associated with depression, memory complaint was also related to poorer memory performance after controlling for the effect of depression. Thus, an accurate self-judgment of poor memory may also lead to a subjective memory complaint.

The relationship between subjective memory complaints and performance was still a matter of controversy. Several studies suggested that people with memory complaints performed less effectively on memory tests than those individuals who had no memory complaints (Dufouil, et al., 2005; Jonker, Launer, Hooijer, & Lindeboom, 1996; Wang et al., 2000). In contrast, some researchers did not find an association between subjective cognitive complaints and a low cognitive performance in older population (Derouesne, Lacomblez, Thibault, & LePoncin, 1999; Mattos et al., 2003). Although the relationship between subjective memory judgment and memory performance is not conclusive, when working with older adults, we must consider and investigate their memory complaints in order to detect problems in a timely manner.

Factors influencing the predictive validity of the memory complaint scale were suggested. For example, researchers found that the predictive validity of memory complaint scales for episodic memory task performance was low (e.g., free recall of word lists or text materials) (Hertzog & Hultsch, 2000; Rabbit & Abson, 1990). In addition, investigators have indicated that negative beliefs about one's own memory contributed to the limited predictive validity, because these beliefs were influenced by negative affects and related factors, such as internalized stereotypes of age decline in memory (Levy & Langer, 1994), concerns about developing Alzheimer's Disease (Hodgson & Cutler, 2004), impairment in daily activities (Turvey et al., 2000), and anxiety and depression

(Jorm, Christensen, Korten, Jacomb, & Henderson, 2001). Thus, healthcare professionals should take older adults' memory complaints into account during encounters. Careful examinations of their cognitive abilities will not only help them identify problems but will also enhance their life quality by reducing unnecessary anxiety.

Newer Directions in Metamemory Studies

Research on metamemory has been extended by including older adults with chronic illnesses, most notably, fibromyalgia (FM), multiple sclerosis (MS), and Parkinson's Disease (PD). The relationship between metamemory and memory abilities among 79 patients with multiple sclerosis (MS) had been investigated (Randolph et al., 2001). Researchers found that MS patients' metamemory was positively associated with verbal recall memory and an attentional test (r = .30, .38, respectively), but negatively correlated with executive function and another attentional test (r = -.30, -.37, respectively). Education and one attentional task measured by Symbol Digit were the significant predictors of everyday memory. In terms of disease-related variables and metamemory, physical disability was significantly related to metamemory (r = -.29, $p<.05$). The authors concluded that MS patients' memory complaints are linked to impairment in other cognitive domains besides memory, such as attentional and executive functioning. This study highlights the implications—for research, treatment, and overall quality of life—of the degree of accuracy with which MS patients are able to assess their memory function. Thus, it is important to help patients determine a holistic assessment of their abilities.

The perception of metamemory in people with PD has attracted researchers. One

study examined the relationship of demographic variables and metamemory in 79 PD patients (*M* age = 66.04, *SD* = 9.72) and 49 healthy elderly (*M* age = 62.55, *SD* = 9.80) (Johnson, Pollard, Vernon, Tomes, & Jog, 2005). Results indicated that the MIA-Change was correlated with age (*r* = -.29); MIA-Task and Anxiety were associated with education (*r* = .30, -.29, respectively). MIA- Capacity, Change, Anxiety, Locus were related to mental impairment (*r* = -.43, -.51, .45, -.41, respectively). Only the MIA-Strategy subscale had a significant difference between groups, reporting significantly less strategy use for PD patients than for healthy counterparts ($p<.05$). Another study examined metamemory in 16 non-demented adults with Parkinson's disease (PD) with average age of 69.42 years (*SD* = 14.19) and 16 healthy older adults (*M* = 67.25, *SD* = 9.60) (Souchay, Isingrini, & Gil, 2006). Results indicated that people with PD were as confident as the healthy older adults in memory performance. However, people with PD were impaired in monitoring their memory performance and had greater impairment in episodic memory Feeling-Of-Knowing (FOK) accuracy than semantic memory FOK. The authors inferred that memory deficits in PD are secondary to executive deficits due to the fact that episodic FOK was significantly associated with executive function.

In studies of memory monitoring of patients with dysexecutive syndrome, scores were on Recall Prediction Index and Feeling-Of-Knowing (FOK) were lower than for the normal control group. During the recall prediction sessions, both groups predicted their future memory performances in a similar manner (Pinon, Allain, Kefi, Dubas, & Le Gall, 2005). The authors concluded that metamemory capacities of dysexecutive patients seemed to be disturbed in the retrieval phase.

People with fibromyalgia (FM) often complain about their memory decline; thus

the metamemory and memory performance was investigated in three groups: 23 FM patients (M = 47.83), 23 age-matched group (M = 47.83), and 22 older adults (M = 66.91) (Glass, Park, Minear, & Crofford, 2005). FM patients reported lower memory capacity and less stability in memory function, and also more anxiety about memory performance when examined in an age-matched group and with older adults, although their knowledge about memory was similar to the other groups. People with FM had lower objective memory performance than that of the age-matched group, but equivalent to the performance of the older controls. The authors suggested that memory interventions which focus on improving self-efficacy may be helpful for FM patients.

In summary, the relationship between memory and chronic illnesses provides researchers with new directions for furthering memory research. For instance, given that the average lifespan for MS patients does not differ substantially from individuals in the general population (Weinshenker, 1994), it is important to help patients assess their cognitive limitations in order to find ways to maximize their remaining memory functioning. Understanding concerns about memory in people with chronic illness is essential because it could enable healthcare professionals to provide better care for patients by helping them to maintain or improve their memory or by instructing them with specific effective strategies.

Everyday Memory as Memory Performance

In contrast to research using a list of words or a paired associate for testing memory performance in traditional laboratory tasks or settings, other studies emphasized the importance of people's recollection of daily activities. In 1978, Ulric Neisser

published an article entitled “Memory: What Are the Important Questions?” He believed that the most important questions concerning memory should arise from everyday experience, such as how memory works in the natural context of daily experience at home, school or work (Neisser, 1979). Moreover, Kausler and Hakami (1983) argued that the standard technique for testing memory is to ask the subject to learn a list of words, and then to test them on how many they remember. This form of testing, however, may not be practical because it only evaluates their memory based on a single task, rather than on a variety of activities more representative of everyday memory use. Thus, it was assumed that daily activities that require less cognitive efforts to remember are performed routinely and automatically; therefore, the age-related deficits in everyday tasks were expected to be diminished (Hultsch & Dixion, 1990).

Additionally, one possible explanation for the lack of a strong relationship between metamemory and memory performance is in the types of tasks used to measure memory performance. Previous research has, typically, utilized traditional laboratory tasks (e.g., lists of words, finding pairs of words, recognition of words) to assess memory function (Hertzog, Saylor, Fleece, & Dixon, 1994; McDonald-Miszczak, Hertzog, & Hultsch, 1995). Such tasks may not represent the basis of judgments made by research participants who are more concerned with daily memory tasks (Ventis, 1992). Hence, in measuring memory performance, the adaptation of memory tasks that are more relevant to daily activities may reveal a different picture for older adults.

Evaluating everyday memory with familiar and meaningful test tasks provides the participants with the accessibility of cues and strategies used in the real world (West & Berry, 1994). Although it does not seem plausible to carry out research into an everyday

contextual environment, researchers have assembled test tasks comparable to those that occur in everyday activities. This type of research also aims to fulfill the potential for ecological validity and generalizibility of research results (West & Berry, 1994). However, Poon (1993) claims that "it is erroneous to assume that tight control can only be achieved in the traditional laboratory" (p. 442). Rather, the importance of classifying laboratory and everyday memory depends on how the substantive questions are asked, not on whether the study is conducted in or out of the traditional laboratory (Poon, 1993).

One early study supported this argument by comparing memory self-efficacy with everyday tasks (map, location, phone, and grocery) and laboratory tasks (such as word, picture, digit, and maze) (Berry,West, & Dennehey, 1989). Everyday memory efficacy tasks were significantly related to memory performance (r = .59 for self-efficacy level, r = .65 for self-efficacy strength), but no significant relationships were found between laboratory efficacy tasks and their performance (r = .37 for level, r = .50 for strength). The authors suggested that task familiarity probably enhanced the degree of relationship between the everyday efficacy belief and everyday task performance.

In the same line of research, there has been an investigation of the relationship between memory self-efficacy and laboratory versus everyday tasks performance in older adults (Berry, West, & Powlishta, 1986). Using the same tasks from the previous research, older adults were also asked to rate their abilities at varying levels of difficulty. Results revealed that the correlations between efficacy beliefs and everyday memory performance were higher than those between efficacy and performance on the laboratory tasks ($P < .05$). The authors concluded that familiarity with the memory task played a role in the degree of relationship between self-efficacy and performance. It also seemed

that when older adults performed more familiar tasks, they might have been more motivated, and, therefore, might have performed better than when they performed traditional laboratory tasks.

Another everyday memory activity, medication instruction recall, was examined in its relation to memory self-efficacy (Neupert & McDonald-Miszczak, 2004). One hundred and five younger adults (M = 19.90, SD = 1.43) and 58 older adults (M = 74.19, SD = 8.65) participated in this study. There were no significant age differences found in medication instruction recall, indicating that if the memory task is relevant to older adults' everyday life activities, they may perform as well as younger adults. Younger adults scored higher in general efficacy belief than older counterparts (M = 57.22, 51.79, $P < .001$); however, older adults had higher scores on task-specific efficacy belief (M = 33.43, 30.42, $P < .001$). The authors suggested that older adults may be influenced by an age-stereotypical belief when assessing their general memory beliefs, unrelated to their perception of a specific memory task. Task- specific efficacy belief was the significant predictor for both groups indicating that belief in one's memory was an important factor in medication instructions recall.

Similarly, in a study examining memory self-efficacy and memory performance in the laboratory designed to mimic an everyday situation as prospective (e.g., remember to do something in the future) and retrospective (recall text instruction; verb-noun pairs) memory, efficacious beliefs predicted prospective memory but not retrospective memory (McDonald-Miszczak, Gould, & Tychynski, 1999).

However, studies of everyday activity memory may not reveal a consistent pattern of results across laboratories. For instance, studies by Kausler and colleagues (1983,

1988) indicate that young adults perform better than old adults in activities requiring less cognitive effort. These authors provided a plausible explanation of this pattern, suggesting that "automaticity of encoding does not necessarily imply automaticity of retrieval" (1983, p.894). Older adults may be able to encode activities automatically; however, they acquire effortful processes of retrieval from the long-term episodic store, including a well-functioning capacity of working memory.

West and colleagues (2002) investigated spatial self-efficacy and location recall (e.g., the location of objects, routes in a buildings), among153 older adults (*M* age = 73) and 80 younger adults (*M* age = 19.3). Results indicated that younger adults performed better in location recall, and women scored higher than men. Although women had higher scores in performance than men, their self-efficacy was lower than men's. The authors also suggested that the older adults tended to overestimate their performance. In older men (n = 43), recall performance was significantly related to self-efficacy strength (r = .32). In older women (n = 110), recall performance was associated with self-efficacy magnitude and strength (r = .21, .24, respectively). The authors claimed that although it was once believed that spatial features of our environments are encoded automatically, their study and others found age differences in spatial memory (West et al., 2002).

In summary, the assessment of everyday memory tasks is more realistic than laboratory tasks which measure a list of words or paired words for older adults. The goal of maintaining older adults' independent living is to help them function well in their surrounding environment. While interacting with older adults, nurses should be aware of older adults' capabilities in performing everyday memory tasks. Older adults who are unable to function independently in their everyday environment may indicate a memory

impairment. Thus, understanding older adults' memory concerns, along with early detection of a memory problem, are important in optimizing their ability to live independently.

Objective Evaluation of Memory (Memory Performance)

This section will review the general memory system and how it is affected with advancing age. Next, selected types of memory will be discussed with respect to memory performance, which is the proposed outcome variable of the present study. These types include episodic, semantic, spatial and prospective memory. Memory performance is "an interaction between external and internal factors" (Zacks, Hasher, Li, 2000, p.294). The external factors include the amount of support, guidance and information which is received by an individual during the process of encoding and retrieval. On the other hand, the critical internal factor is "the processing resources the person has available for memory encoding and retrieval" (Zacks et al., 2000, p.295). The presumption that older adults are less likely to perform resource-demanding tasks seems to be related to memory decline with age (Craik, 2000).

Aging and Memory

Age-related changes in memory performance have been researched extensively. The goal of investigating this domain of knowledge is to "understand the ways in which cognitive functions may be affected by the passing years as people move into old age, the extent of awareness of, and adaptation to, any changes in cognitive function, as well as the evidence regarding possibilities for active intervention to delay or diminish effects of cognitive aging" (Lovelace, 1990, p.1). Based on laboratory research in the 1960's and

1970's, the model of information-processing has dominated studies in finding whether age-related differences in memory processing exist (Poon, 1985). This model is based on the metaphor of computer technology that depicts the storage and processing of information.

Processing information involves three memory stores: a sensory memory, a short-term or primary memory, and a long-term or secondary memory (Matlin, 1998). New information is initially registered in sensory memory. If the information is not lost in sensory memory, then it will move to primary memory. Primary memory refers to a limited-capacity store of information that is still in the mind and can be retrieved without effort. Next, if not lost, the information enters the secondary memory, where information will not easily disappear with the passage of time. However, we do forget things, and effort is needed to retrieve that information (Poon, 1985). Research findings indicated that there is a greater age-related decline in secondary memory than in primary memory (Craik, 2000). Additionally, it is often assumed that old people can remember events long in the past but have difficulty in remembering things that happened recently. The memory for events long in the past is called remote or tertiary memory. Although research has shown that some memories can be retained for a long time, generally, a decline in memory is a function of time (Salthouse, 2004).

Researchers not only regard short-term memory as a location for a limited store of information but also as an active and conscious information process. These functions of storage and process in short-term memory further develop the concept of working memory, which is a currently more popular term (Lovelace, 1990). Working memory acts as the immediate memory function which demands the processing and storage

information simultaneously (Baddeley, 1986). For example, a person is required to solve a series of addition problems while recalling a certain number in the equation. In a second example, individuals try to remember a string of digits (e.g., phone numbers) while driving. He/she needs an intact working memory to successfully and simultaneously perform these tasks. Research has suggested that there are substantial age differences for such tasks in favor of the young (Light, 1996). In addition, numerous conceptualizations exist and each represents different purposes. For instance, memory has been discussed in three stages: encoding (formation of a code), storage (retention of the code until the time of output), and retrieval of information (utilization of the code at the time of output) (Matlin, 1998).

The Processing Speed Theory

Another facet explaining age-related variance in memory performance is the speed of memory processing (Salthouse, 1991, 1996). It is suggested that older adults tend to display a generalized, decreased speed in performing memory or other cognitive tasks. Two mechanisms underlining this theory are those of limited time and simultaneity. The limited time mechanism refers to the fact that "the time to perform later operations is greatly restricted when a large proportion of the available time is occupied by the execution of earlier operations" (Salthouse, 1996, p. 404). This mechanism implies that the level of task complexity will influence people's speed in accomplishing the task, in particular, when there is a time limit. Furthermore, the simultaneity mechanism indicates that "the products of earlier processing may be lost by the time that later processing is completed" (1996, p. 405). In other words, no information is available when

it is needed. Older adults are, therefore, likely to perform less effectively than younger adults due to the fact that older adults are slower in earlier steps of the performance. This slow pace impedes their later steps in completing the performance because of insufficient information from earlier steps. The measurement of speed-processing in literature includes the accurate judgment of same-different pairs of digits, letter strings, or objects in a fixed time.

Episodic Memory

Episodic memory involves the acquisition and retrieval of information in a particular time and place (Craik, 2000) . What makes episodic memory different from other types of memory is its requirement of "traveling back in time to remember personally experienced events through conscious recollective processes" (Backman, Small, & Wahlin, 2001, p. 354). Likewise, when people complain that their memory "is not as good as it used to be," this type of memory is referred to as episodic memory (Craik, 2000). Laboratory studies of individuals' episodic memory use tests to measure one's ability to recall words, prose, or pictures. Participants are usually presented with a list of stimuli, then they are asked to remember the list as much as they can, and sometime later they are assessed in their recall ability. Older adults have much more trouble than younger adults in episodic memory functioning (Hoyer & Verhaeghen, 2005; Smith, 1996). Moreover, people's episodic memory may decline from their thirties to the late adulthood, and the decrement of episodic memory is greater than it is for other types of memory (Craik, 2000).

Notably, Backman and colleagues (2001) maintained that the age-related decline

in episodic memory across adulthood generates three characteristics. First, memory decline may occur in the early stage of life. For example, it has been shown that autobiographies from around twenty years of age tend to be most vivid. Second, the decline of episodic memory is continuous from early to late adulthood, rather than in a discrete form. However, an early decrement in episodic memory should be examined to determine for biological reasons or other factors for the decline. Third, the rate of decline is relatively slow, which may account for the small age-related changes observed in longitudinal studies.

In research on aging and episodic memory, two critical factors are the type of measurement and the size of the age-related impairment across different encoding and retrieval conditions (Craik, 2000). Arguably, the difference in memory performance between young and older adults may depend on the nature of the tasks. When task conditions are more environmentally supportive such as giving more guidance, the age differences tend to be reduced (Craik, 2000). The provision of more meaningful events or elaborate instructions at encoding and a cued recall at retrieval rather than a free recall, are helpful to older adults. Age differences, in general, increase from recognition through cued recall to free recall (Light, 1991). In other words, older adults' memory performance can be enhanced by providing more supportive material at encoding and retrieval.

Semantic Memory

Semantic memory refers to "the retrieval or use of accumulated knowledge about people, places, and things without an explicit appraisal of when or where the information was experienced" (Hoyer & Verhaeghen, 2005, p.216). Thus, semantic memory is

usually separated from episodic memory, which focuses on a particular time or place in acquisition (Craik, 2000). Older adults perform as well as younger counterparts on general knowledge of IQ tests (Salthouse, 1991). Semantic memory is often evaluated by vocabulary tests. Research findings suggest that the vocabulary scores were higher with advancing age until about the mid-50s, and at this age they either had a stable ability or a slight decline (Salthouse, 2004). The interpretation of this result is that knowledge accumulates as one ages. Likewise, a meta-analysis of age difference in vocabulary appears in older adults with a mean age 70.7 years who perform better than a younger group with a mean age of 22.5 years (r = .40) (Henry, MacLeod, Phillips, & Crawford, 2004).

One interesting aspect of semantic memory is the internal lexicon. The internal lexicon consists of a network that represents words, concepts, and their interrelations (Backman et al., 2001). It is assumed that the information is organized hierarchically and is followed as a top-to-bottom structure. For example, fruit as a category is represented at the top of the hierarchy, following by more specific characteristics such as color (red) or taste (sweet). Along with this concept of the hierarchy, lower order categories correspond with the previous level. In this line of research, no age-related difference was found in the organization and associative structure of the internal lexicon (Laver & Burke, 1993). These authors further suggested that the semantic network may not decline with age, but that lexical access may be slower in old age. Likewise, another study indicated that the problems of semantic memory experienced by some older adults are caused by retrieval failures rather than structural changes (Hultsch, Hertzog, Small, McDonald-Miszczak, & Dixon, 1992). These authors reported an age-related decline across a 3-year period in

tasks of recall and verbal fluency, which are high retrieval demands, but not for vocabulary tests, which have a high level of retrieval support. Thus, the organized structure of conceptual knowledge generally remains stable across adulthood.

Nevertheless, age-related decrement in some aspects of semantic memory in healthy older adults is reported. Difficulties in finding words, retrieving names or categorizing subjects are examples of this decrement (Hough, 2004; Maylor, 1990). Research conducted in this area tends to differentiate between whether older adults have dementia, because difficulties in naming and word retrieval are as the early signs of the onset of this condition (Hough, 2004).

Spatial Memory

Spatial memory is used in daily life. For example, we remember how to return home from work, where we park our car, how to find our way by the location of a prominent landmark and so on. A particular type of spatial memory relevant to the present study is route learning, meaning how people remember how to get from one place to another (Cavanaugh & Blanchard-Fields, 2002). Wilkniss and colleagues (1997) studied route learning in a hospital for 25 older adults (*M* age = 70.20, *SD* = 5.66) and 25 younger adults (*M* age = 19.48, *SD* = 1.08) by using map vs. no-map strategy. Their findings revealed that older adults were as good as younger adults at recognizing landmarks in the environment, but older adults had a greater difficulty in providing order to the consequence of landmarks.

Spatial memory has also been examined in a virtual environment. A study examined route learning of a maze in a virtual computerized environment among young

(n = 23), middle (n = 43) and older adults (n=46) (Moffat, Zonderman, & Resnick, 2001). Although all age groups improved with each test trial, older adults displayed an overall poorer performance than that of younger age groups. In other words, the older group went more frequently to error locations (locations that had previously been visited in error), took longer to solve the task and went a longer distance to do so. These authors further argued that the result of age difference was not a function of inadequate computer competency in older adults, because all participants had training before embarking on the formal test. Similarly, older adults performed less well than younger counterparts on a computerized maze learning (Pietrzak, Cohen, & Snyder, 2007). These authors further suggested that age-related difference in spatial memory was because of the decline of executive function with advancing age.

In contrast to the aforementioned learning and remembering routes, researchers attempted to find whether there were age differences (young, n = 89; middle, n = 132; old, n = 105) in planning or selecting routes (Salthouse & Siedlecki, 2007). Two measures assessing the efficiency of route selection were used: the amount of time in completing the perceptual mazes, and the distance of the route selected to visit six locations in a zoo. Findings revealed an age-related decline in both measures of route selection. The authors suggested that this age-related decline in selecting efficient routes was due to the impairment in formulating the plan rather than in executing the plan. In general, memory for spatial information declined across the life span. This observation was evidenced by a meta-analytic study (Spencer & Raz, 1995), and processing speed was a primary indicator for this age-related change (Finkel, McArdle, Reynolds, & Pedersen, 2007).

Prospective Memory

Prospective memory requires the individual to remember to do something at some time in the future (Hoyer & Verhaeghen, 2005). In everyday life, people often frame intentions to undertake an activity at a later time or date; for example, remembering to include a visit to the post office on the way home, when planning a daily schedule in the morning. The performance of prospective memory reflects an individual's ability to form intentions and execute the intended activity that is delayed or maintained in memory until the condition for completing the activity is appropriate (Einstein et al., 2000). Thus, prospective memory plays an essential part in successful independent living. For example, if a person is in the shower and remembers it is time for his medication, then he must wait until finishing his shower before going to the medication cabinet.

There are a variety of tasks which determine prospective memory performance. Typically, these tasks require participants to perform a background task with the additional instruction to perform some types of action when, at some point during performance of the background task, a cue is presented (Vogels, Dekker, Brouwer, & de Jong, 2002). For example, the background task is to remember a long list of pictures with names on a computer screen, at the same time, participants need to press a designated key when a cue is present, such as seeing a picture of a person wearing glasses or the appearance of a target word. Assessing prospective memory is particularly relevant to cognitive aging because the inability to plan and to keep the prospective intention activated during the ongoing performance of a background task, suggests a deficit in frontal lobe function (Vogels et al., 2002).

Two types of prospective memory are often discussed in literature. A time-based

prospective memory requires the person to perform a future task after a certain period of time has elapsed, whereas event-based prospective memory usually presents a cue as a prompt for future remembering and action. McDonald-Miszczak and colleagues (1999) exemplify a time-based task: a researcher gives a set of questionnaires and explains the procedures, and also explains the need to call her supervisor after 20 minutes. The researcher then asks the participant to remind her to do so. As she leaves the room, the researcher starts a stopwatch to time each participant's response. Event-based prospective memory in this study is assessed by using a blurry page in the set of questionnaires, and participants are asked to help the researcher identify the blurry page.

The evidence of age effects on prospective memory is not entirely consistent. Results vary depending on the environment of the test (laboratory vs. homelike settings), the use of memory aids, the resource demands of a background task (some background tasks are more difficult than the others), or the time interval for activating an intended action. Earlier studies indicated no age deficits in a naturalistic environment (West, 1988), and a short time interval to carry out the action (Einstein & McDaniel, 1990). However, age effects on prospective-memory performance have been found in literature. In Maylor's (1996, 1998) studies, older participants revealed more difficulties in prospective memory tasks than younger participants, and age did not influence the choice of aids. Likewise, even modifying the background task to be less demanding to older adults, they still found significant decline in maintaining even a limited amount of information over very short intervals (Einstein et al., 2000). These authors further suggested that the decreased working memory capacity in older adults may explain an age-related decline in prospective memory performance, because of older adults' inability

to maintain intention actively over the delay interval while performing the other tasks.

A meta-analysis of prospective memory in laboratory studies indicated that younger adults performed better than older adults in both time- and event-based tasks (r = -.39, r = -.34, respectively) (Henry et al., 2004). These authors also reported that prospective-memory performance has been found to be less age sensitive than episodic memory in laboratory studies, regardless of whether the task was time-based (i.e., remembering to do something at a particular time) or event-based (i.e., remembering to do something when a particular event occurs). Age-related difference in prospective memory appeared to be unaffected in the naturalistic environment suggesting that older adults were able to compensate for any age-related decrement in basic processing mechanisms (Henry et al., 2004).

A variety of memory theories have attempted to explain the well-documented age-related change in some aspects of memory performance in older adults (Backman et al., 2001; Hoyer & Verhaeghen, 2005; Light, 1991; Zacks, Hasher, & Li, 2000). The general consensus is that memory performance does decline in older adults, but also that the amount of loss depends very much on the specific memory task under consideration. Performance on some tasks decreases considerably in older people, whereas performance on other tasks shows little or no decline. Most early literature of memory aging indicates a difference between short-term and long-term memory process and tasks, inefficiencies in encoding, storage and retrieval stages, and the differential aging of visual-spatial processing relative to verbal processing (Hoyer & Verhaeghen, 2005).

To sum, memory performance appears to decline with advancing age, although some aspects of memory remain intact. The assessment of objective memory in older

adults plays a critical role, because it not only helps healthcare professionals identify any memory-related deficits, but it also facilitates an independent lifestyle in older adults. With more understanding of mechanisms underneath the memory systems, nurses may gain better insights into older clients' memory concerns, which will enable them to devise more appropriate care plans to address older adults' healthcare needs.

Summary

This chapter provides a review in literature concerning memory and aging. In particular, evaluation of subjective and objective memory in older adults is discussed. Although the relationships between subjective and objective memory in elderly population remain inconsistent, both factors are imperative in understanding older adults' concerns about their own memory, and in helping nurses gain more accurate knowledge about memory and aging. There has been a substantial literature on aging memory in Western societies, however, this subject is less researched in the older Asian population. The need to understand memory and aging in both western and eastern cultures is vital in order to bridge the gap in literature. Therefore, this study examining Taiwanese older adults' subjective and objective memory is important because it is not only to understand the characteristics of memory in this specific population, but also expand the literature of cognitive aging globally.

Chapter 3: Methodology

This chapter describes the research methodology that guided this study. First, an appropriate research design is described. Then the rationale for determining an adequate sample size is provided. Next, the procedures for data collection, instruments, and methods of data analysis are illustrated. The importance of protecting human research subjects is acknowledged. Finally, the findings from a pilot study in translating a major instrument are reported.

Research Design

A cross-sectional design was used in this study. The advantages of a cross-sectional design allow the investigator to collect data at only one point at one time and there is no loss of participants because of research attrition (Houser, 2008). A descriptive correlation design was also employed in this study. The strength of correlational research helps researchers to explore the relationships among study variables (Houser, 2008). It can be used to determine hypotheses, to answer research questions, or to discover associations in the study. Although this type of design is not to infer causality in the results, however, it could provide substantial evidence to support causality (Brink & Wood, 2001). The cross-sectional descriptive correlation design was therefore appropriate for this study, which asked these research questions: (1) What are the distinguishing characteristics of the demographics, health, metamemory, memory self-efficacy and memory performance among Taiwanese older adults? (2) What are the gender differences in the health, metamemory, memory self-efficacy and memory performance among Taiwanese older adults? (3) What are the relationships between

demographics, metamemory and memory self-efficacy, and memory performance among Taiwanese older adults? (4) What are the predictors of memory performance among Taiwanese older adults while controlling for age, education and health? Two hypotheses are generated: a) metamemory is positively correlated with memory performance among Taiwanese older adults; b) memory self-efficacy is positively correlated with memory performance among Taiwanese older adults.

Population and Sample

The target population for this study was older community dwellers in Taiwan. The sample was recruited from three community centers located in central Taiwan. A non-probability, convenience sampling was employed to recruit potential participants. Inclusion criteria for the Taiwanese older adults were : (a) they were of age 65 years or older; (b) they had an ability to communicate orally or in writing; (c) they were available to the researcher for one and a half hours of data collection; and (d) they had no terminal diagnoses. Examples such as heart failure, cancer, respiratory failure, renal failure, or any other conditions would have hindered an older adult from giving voluntary, informed consent or precluded their participation in this 90-minutes interview. These terminal conditions also impact on memory, and would therefore result in biased data.

The sample size was determined from two considerations. First was the computer software Power Analysis and Sample Size (PASS) based on Cohen's (1988) statistical power analysis method. The PASS was estimated by using the 12 variables in the pilot study as R^2 .53, with a level of power of 0.8 at a significant alpha level of .05, and a recommended sample size of 130. Second, the use of at least 10 subjects for one

predicting variable was proposed in order to produce a stable equation (Nunnally & Bernstein, 1994). Thus, a minimum of 120 people were required, because twelve independent variables were included in the study.

The investigator interviewed 134 subjects initially. Two potential participants did not complete the interview because they changed their minds about continuing the interview. Another two subjects did not complete the interview due to time constraints and did not agree to set another time for the rest of the interview. A total of 130 participants were included in the data analysis.

Procedures for Data Collection

In collecting the data for this dissertation study, 130 community-dwellers attending three senior citizen activity centers in central Taiwan were invited to participate in face-to-face interviews. One senior citizen center, the largest one in the west district, offered entertainment programs as well as educational services for older people aged 60 years or older. The center included an auditorium, a big formal classroom and a multipurpose room, which was appropriate for both a singing class and Pinpun (table-tennis) sport. This center had attracted more than 400 members owing to the diversity of its programs. Thirty participants recruited for the pilot study were from this center, and they were excluded for the formal study. Another smaller recruitment center mainly provided formal classes for older adults who were interested in learning English, computer skills, painting and other subjects. The last center offered a weekly entertainment program such as singing, dancing or Taichi for older adults. The investigator discussed the purpose of this study with the directors of each center and obtained approval for recruitment. The letter of authorization from each center director

was included as appendix A.

The researcher visited classes at each of these centers coordinated through a program schedule. At the beginning of the class, the research introduced the research topic, described the inclusion criteria and provided a sign-up sheet for prospective participants. The researcher answered questions during the class break and invited older adults to join this study. At the first center, people actively participated in the study. However, the recruitment process was not quite successful at the second center. The researcher then approached potential participants with her business care and a reworded invitation. The question was changed from "Would you be interested in doing a memory survey?" to a better choice: "Would you like to learn about memory function?" A cover letter was used instead of a written consent form (see Appendix B). This decision was made to respect the cultural tradition. Taiwanese older adults are reluctant to sign any paper forms since they consider this to be a legal act (Lai & Good, 2005). The investigator explained the purpose of the study to the potential participants, and they were given time to read the cover letter and ask questions. Acceptance of the cover letter indicated an agreement to take part in this study. All individuals participated voluntarily, and all interviews were conducted in a private room in the center or in the participant's designated place.

The investigator then collected demographic data and assessed the mental status of the participants to determine their eligibility for the study. A brief mental assessment test, the Short Portable Mental Status Questionnaire (SPMSQ) as Appendix C, was employed to screen for cognitive impairment. If participants made more than two errors in the SPMSQ, they were excluded from the study. Their answers were validated with

data from their identification card which served the same purpose as a driving license in the U.S.

The order of administrating instruments began with health status, memory self-efficacy, metamemory, and memory performance. Each interview was to take about one hour to complete; however, the length of the interview depended upon the individuals. The interview time ranged approximately from forty-five minutes to ninety minutes. There was a break offered during the interview, although none of the participants requested it.

Instrumentation

Six instruments were used for this study. They were: (1) demographic information (2) Short Portable Mental Status Questionnaire (SPMSQ) (3) Self-Rated Health Scale (SRHS) (4) Metamemory in Adulthood (MIA) (5) Memory Efficacy (ME-4 items), and (6) Rivermead Behavioral Memory Test (RBMT). Each instrument was explained in the following section. The discussion of the pilot study has been included in the later part of this chapter

Demographic information

This questionnaire was developed by the researcher and contained questions concerning age, gender, education, marital status, living arrangements and number of chronic illnesses. It was included as appendix C.

Mental Status

The Short Portable Mental Status Questionnaire (SPMSQ) acted as a cognitive screening test for potential participants (see Appendix C). This ten-item measure of

cognitive functioning and is designed to detect levels of cognitive dysfunction by using cut-off points for impairment (Pfeiffer, 1975). It represents different domains of cognitive function including short- and long-term memory, orientation to time and place, information about current events and ability to conduct serial operations. The SPMSQ was selected as a primary cognitive screening test because of its good reflection of a person's current state of cognitive function and its ease of completion for older adults.

There were four categories of cognitive function in the SPMSQ, and each item was scored either as being correct or in error. Intact cognition was categorized for 0-2 errors; mild impairment for 3-4 errors; moderate impairment for 5-7 errors; and severe impairment for 8-10. However, the SPMSQ took into account both education and race differences. People with grade school education were allowed to have one more error; those with educations of high school or beyond were restricted to one less error. African Americans were allowed one more error.

Test-retest reliability of the SPMSQ for 59 patients aged 65 or older over an interval of 4 weeks was .82 (Pfeiffer, 1975). The scores of SPMSQ were compared with clinical diagnoses to obtain the concurrent validity. Based on their clinical diagnoses, 133 psychiatric patients were categorized as having organic brain syndrome and non-organic brain syndrome. Each patient was measured with the SPMSQ and compared with his clinical diagnosis. There was 82% of agreement between these two tests when the score of SPMSQ indicated mild or no impairment, and 92% of agreement was found when the SPMSQ scores showed severe impairment. The convergent validity was also established by comparing the SPMSQ with another screen of cognitive function: Orientation-Memory-Concentration test (OMC). The correlation between these two tests was .80

(Fillenbaum, Landerman, & Simonsick, 1998).

The SPMSQ was used previously with Taiwanese older adults (Chen, Tseng, Ting, & Huang, 2006; Wang, 2006). Internal consistency of the SPMSQ was reported as .70 in elderly Hong Kong Chinese (Chou, 2002), and .98 in a study examining the degree of the loneliness among Taiwanese older adults (Yeh & Lo, 2004).

Health Status

Health status, defined as an individual's perceived general health over a period of time, was operationalized by a Self-Rated Health Scale (SRHS) (see Appendix C), a subscale of the Multilevel Assessment Instrument (Lawton et al., 1982). SRHS was composed of four items which were rated on a 3- to 4-point scale. The total score for this instrument ranged from 4 to13, with higher scores indicating better health. Lawton and colleagues (1982) reported that the reliability of SRHS was .76 in a sample of 590 older adults living in different types of environment. Twenty-two people were administered the test two times, with a three-week interval in between. The correlation between these two tests was .92. The validity was assessed by using summary rating correlation between the SRHS and physical health domain in the same population, indicating a coefficient of .67. Additionally, the discriminant validity was evidenced as .32 in participants with two different types of living arrangements (dependent vs. independent).

SRHS has been used in other cultures. The internal consistency of SRHS in 117 Japanese nursing home residents was .59 (Ide, McDougall, & Wykle, 1999). A Chinese version of SRHS was reported by (Cheng, 2006) with two groups of Chinese immigrant mothers. The Cronbach's alpha was .66 in her pilot study with 30 mothers and was .75 with 150 mothers. Internal consistency of the SRHS was .63 in the current study.

Metamemory

Metamemory, a self-evaluation of memory knowledge, attitudes and affect, was operationalized for this study by Metamemory in Adulthood (MIA)(see Appendix C) (Dixon, & Hultsch, 1983b; Dixon, Hultsch, & Hertzog, 1988). The MIA consisted of 108 items which were rated on a 5-point scale. The MIA included 7 subscales: Achievement, Anxiety, Capacity, Change, Locus, Task, and Strategy. An example question and the number of items for each subscale have been illustrated in Table 1. Metamemory, which is a multidimensional construct, has perhaps not been familiar to many people. People can, perhaps, be intimidated by the length of the MIA. However, the psychometric characteristics of MIA were examined with 10 samples with more than 2,000 individuals with ages ranging from 18 to 84 years (Dixon et al., 1988). It is a well-used instrument for understanding the construct of metamemory in Caucasian and African American older adults.

Reliability. In studies to examine the psychometric characteristics of the MIA multiple samples of university students, community-dwelling middle-aged and older adults have been evaluated (Dixon, Hultsch, & Hertzog, 1988). The internal consistency reliabilities for each subscale from 5 samples (n = 120, n = 108, n = 150, n = 388, n = 42) were reported as: Achievement (.76 - .79), Anxiety (.83 - .87), Capacity (.81 - .86), Change (.90 - .93), Locus (.71 - .78), Strategy (.82 - .86) and Task (.78 - .83). Furthermore, McDougall (1994) reported alpha reliability of the MIA in a group of 128 mid-to-old adults ranged in age from 55 to 83 years (M = 67.94, SD = 6.30). Findings were: Achievement (.80), Anxiety (.83), Capacity (.85), Change (.92), Locus (.79), Strategy (.85) and Task (.84).

Table 1: The Metamemory in Adulthood (MIA)

Dimension	Description	Items
Achievement	It measures individuals' degree of motivation to perform well in memory-demanding tasks; the more importance respondents attach to good memory performance, the higher their score on this dimension. eg. It is important to me to have a good memory.	16
Anxiety	It measures the degree to which anxiety and stress influence individuals' memory performance; the greater the effect of anxiety on performance, the higher the score on this dimension. eg. I get upset when I cannot remember something.	14
Capacity	It measures individuals' perception of their own memory performance by asking them to predict how well they will perform specified memory-demanding tasks; the greater the expected ability, the higher the score on this dimension. eg. I am good at remembering names.	17
Change	It measures individuals' perception of their memory abilities' trend over time; the greater the perception of stable memory abilities, the higher the score on this dimension. eg. I can remember things as well as always.	18
Locus	It measures the degree to which individuals believe they have or retain personal control over their own memory ability; the greater the perception of personal control, the higher the score on this dimension. eg. I can't expect to be good at remembering zip codes at my age.	9
Strategy	It measures individuals' instrumental use of memory mnemonics to assist in the performance of memory-demanding tasks; the greater the individual's use of memory strategies, the higher the score on this dimension. eg. When you are looking for something you have recently misplaced, do you try to retrace your steps in order to locate it?	18
Task	It measures individuals' knowledge of typical memory performance for a given task; the greater the individual's knowledge, the higher the score on this dimension. eg. For most people, facts that are interesting are easier to remember than facts that are not.	16

Validity. The evidence for convergent validity was suggested by correlating subscale scores in the MIA with indicators from Memory Functioning Questionnaire (MFQ) in Annville sample (Hertzog et al., 1989). MIA-Strategy (the higher score indicates the higher use of strategy) was strongly correlated with MFQ-Mnemonics (the higher score indicates the lower use of mnemonics) (r = -.70). MIA-Capacity was positively correlated with five subscales of the MFQ: Frequency of forgetting (r = .67), Past events (r = .58), Forgetting novels (r = .52), Forgetting magazines (r = .49) and General rating (r = .35). In addition, MIA-Change subscale was correlated with MFQ 4 subscales: General rating (r = .35), Retrospective functioning (r = .36), Frequency of forgetting (r = .56), and Past events (r = .43). Similarly, MIA-Anxiety was found to have correlations with MFQ-General rating (r = -.33), Frequency of forgetting (r = .67), Forgetting magazines (r = -.41) and Past events (r = -.38).

The evidence for discriminant validity of MIA was obtained from small correlations with some instruments (Hultsch, Hertzog, Dixon, & Davidson, 1988)). The MIA subscales and 5 subscales of Jackson Personality Inventory (JPI)-Anxiety, Affect, Energy, Self-esteem and Conformity were examined. Results indicated there were no correlations between MIA subscales and JPI subscales, except the MIA-Anxiety was correlated with JPI-Anxiety (r = .44) and JPI-Self-esteem (r = .42). Moreover, the MIA was assessed with Levenson's Locus of control-Internal, Powerful Others, and Chance. Small correlations ranged from .01 to .17. Two remaining measures included a psychological well-being measure (Veit/Ware scales) and a depression scale (Center for Epideminological Studies Depression-CESD). The MIA generally correlated at low levels with the Viet/Ware and CESD (r = .00 to .18). One major exception was the MIA-

Anxiety with VW-depression (r = -.36) and VW-well-being (r = -.31).

There was some evidence for predictive validity between MIA scales and performance on various cognitive measures. Low to moderate correlations were observed for the relationship between the MIA scales and measures of text recall in three samples (Dixon & Hultsch, 1983a). Correlation coefficients for the first sample (n = 120) ranged from .28 to .47; in the second sample (n = 108) the range was from .23 to .38; and the third sample (n = 150) ranged from .23 to .47. In addition, in a sample of women, aged from 21-78 years, low to moderate correlations (r = .23 to .47) were indicated between MIA scales and measures of cognitive abilities (e.g., verbal comprehension, induction, and memory span) (Dixon, Hertzog, & Hultsch, 1986). However, the developers argued that the purpose of MIA was not designated to be the screening tool for memory problems but rather a measure of knowledge, attitudes and strategy use that could be helpful for aging research (Dixon, Hultsch, & Hertzog, 1988).

The MIA has been less well known among various ethnic elderly populations. However, in a study to raise memory awareness for 117 Japanese elderly residing in nursing facilities, the coefficient alphas for five subscales were Achievement (r = .73), Capacity (r = .77), Change (r = .82), Locus (r = .73) and Strategy (r = .75) (Ide, McDougall, & Wykle, 1999). Internal consistency of the MIA in this study was Achievement (r = .82), Anxiety (r = .90), Capacity (r = .86), Change (r = .89), Locus (r = .74), and Strategy (r = .86) and Task (r = .78), indicating the MIA is a reliable instrument for measuring the construct of metamemory.

Memory Self-Efficacy

Memory self-efficacy has referred to one's beliefs in one's own capability to

perform a specific memory task. Memory self-efficacy has been operationalized by Memory Efficacy (ME), using a Guttman scale with 4-items (Lachman & Leff, 1989). The ME questionnaire was developed from Bandura's self-efficacy method and was designed to obtain older adults' perception of self-efficacy level and strength (confidence). Two memory domains were concerned: prevention of memory decline by maintaining proper skills, and the use of general or specific strategy. Participants predicted their performance based on self-efficacy level (*Yes* or *No*), and strength (ranging from 10% to 100%). Respondents first answered the question on self-efficacy level; if the answer was *NO*, their confidence rating was 0%. If the answer on the level was *Yes*, then they were asked to indicate the percentage of their confidence in doing the specific memory task. Lachman reported that the internal consistence reliabilities were .57 for the level and .68 for the confidence (as cited in McDougall et al., 2003). Likewise, Cronbach's alphas were .51 and .73 in a study of memory improvement with 78 octogenarians (McDougall, 2002). In the present study, internal consistency was .53 for the level and .80 for the confidence.

One self-report question in Memory Efficacy (ME) scale was named as memory evaluation. It was determined with one question from the memory, "How good is your memory now?" The respondents rated their memory on a 7-point scale from 1 (*very poor*) to 7 (*excellent*).

Some remedies were created to compensate for the problems found in the pilot study by using Memory Efficacy. First, for the purpose of parsimony, the rating of confidence was changed from 10 - 100 % to 1-10 based on the instruction guide for measuring self-efficacy (Bandura, 2006). Furthermore, descriptors were provided to

explain the scale as “little confidence” under point 1, “moderate confidence” under point 5, and “100% confidence” under point 10. These statements were employed to help respondents conceptualize the rating of the scale. Last, the investigator provided a large-print paper of the Memory Efficacy scale, which aimed to assist elderly Taiwanese in answering this kind of measurement that was not familiar to them.

Rivermead Behavioral Memory Test

Everyday memory performance was defined as an objective measure of memory function which provided analogs of situations appearing in daily life (Cockburn & Smith, 1991). Everyday memory performance was operationalized by the Rivermead Everyday Behavioral Memory test (RBMT) (see Appendix C). The RBMT included tasks covering a range of everyday memory skills: remembering names, a hidden belonging, a future appointment, or delivering a message. Other skills included recognizing pictures of daily objects and photographs of human faces; recalling a short story, such as the news format; a route around a room; and orientating oneself in time and place. A brief description of tasks has been illustrated in Table 2. For each subtest, two scores were produced: screening score (pass/fail), and standardized profile score (score 2 for success on all parts of the item, 1 for a single error, 0 for more than one error). The Screening score was used in clinical settings and the Standardized Profile Score was for research. Therefore, each participant yielded two summary scores: a screening score (0-12) and a profile score (0-24). The cut-off point was three or more failures; thus, a screening score of 10-12 represented normal level of memory function, 7-9 was poor memory, 3-6 was moderately impaired, and 0-2 was severely impaired (Wilson, Cockburn, Baddeley, & Hiorns, 2003).

For the standardized profile score, the range of normal memory function was 21-24, poor memory ranged from 17-21, moderate impairment was 10-16, and severe impairment was 0-2.

Validity. To establish the convergent validity, 118 adults were tested to determine the association between the RBMT and a number of standard memory tests (Wilson et al., 2003). These standard tests included the Warrington Recognition Memory Test (1984) for words, faces, digit span and spatial span; the Randt Memory Test (1980) for the paired-associated test; and the Collins and Quillian test for a sentence verification task (Baddeley, 1981). The correlations of the screening score ranged from .22 for the semantic processing task to .60 in the case of recognition memory for words. Likewise, correlation coefficients were from .20 to .63 in the profile score. Although the RBMT correlated positively with other memory tests, the coefficients were low to moderate. It can be explained that because the RBMT measured everyday memory, whereas the comparative tests were laboratory-based measures (Wilson et al., 2003). Moreover, the validity was evidenced by the correlation of the RBMT and the therapists' observation of patients' memory failures (Wilson et al., 1989). Physical or occupational therapists completed a checklist for patients' memory lapses for two weeks. The number of these lapses were significantly correlated with the RBMT screening and profile scores (r = -.71, -.75, respectively), which indicated that the RBMT was a valid instrument for everyday memory function.

Table 2: Tasks in the Rivermead Behavioural Memory Test

Task	Description	Memory system
Remembering names	Recalling a person's first and last names after 20 minutes	Episodic memory
A hidden belonging	Remembering to ask for a return of a personal belonging which is being held until the test session is finished	Prospective memory
An appointment	Remembering to ask about an appointment in response to a cue as the sound of a kitchen timer	Prospective memory
Pictures recognition	Recognizing pictures of familiar objects in which they are presented briefly and tested mixed with distracter items. It is tested immediately after presentation and a delay.	Episodic memory
Remembering a prose	Recalling a prose passage in the format of a news story which is tested immediately and after a delay	Episodic memory
Faces recognition	Recognizing unfamiliar photographs of faces tested with distracters after minutes	Episodic memory
Recalling a route around a room	Remembering a route in a room tested immediately and after a delay	Spatial memory
Deliver a message	Remembering to deliver a message in a particular spot while walking in the room	Prospective memory
Orientation	Knowing the time, place and current situations	Long-term memory

Reliability. Two forms of reliability were established: interrater and parallel forms reliabilities (Wilson et al., 2003). First, inter-rater reliability was obtained by two raters who scored 40 subjects. Results suggested a 100% agreement between raters for both screening and profile scores. Next, for the parallel- form reliability, 118 people participated in a study to establish parallel reliability in 4 versions. All participants completed version A, approximately a third of them also completed version B, another third completed version C, and the last third completed version D. For the screening score, correlation between performance on version A and B, C, D was .84, .80, and .67 respectively. For the profile score, the correlation between version A and B, C, and D was .86, .83, and .88 respectively. The authors suggested that the low correlation between version A and D on the screening profile indicated that the profile score was a more reliable test of a person's memory function. Test-retest reliability for screening score and profile score were .78 and .85. The internal consistency of the RBMT in an elderly population has also been supported. Investigating everyday memory performance in 78 octogenarians with an average age of 82 years, the screening score was .73 and the profile score was .86 (McDougall, 2002).

The RBMT has been translated into Hong Kong Chinese, namely a Cantonese version of the RBMT (RBMT-CV), to examine its utility in discriminating between patients with brain injury and memory impairment, from those without impaired memory (Ng, et al., 1996). The authors reported that the RBMT-CV demonstrated a good content validity (.70 - .90) and inter-rater reliability (.67 - .96). Parallel form reliability was obtained between Version A and B (.38 - .94), and, Version A and C (.52 - .92). The Cronbach's alpha of Version A was .86. In addition, the authors suggested the cut-off

score of 15 in differentiating clients with impaired memory from those who were not. However, the cut-off score of 15 was lower than the score of 16 reported from the developers of the RBMT (Wilson et al., 1989); thus, the authors suggested the need for further explorations of the RBMT-CV.

Despite the well-established reliability and validity of the RBMT-CA, the differences in Chinese language made the RBMT-CV virtually impossible to use for the Taiwanese population. Nevertheless, the extended version of the RBMT, which doubled the number of test items, was employed with elderly Taiwanese immigrants (Suen et al., 2004). The authors reported the Cronbach's alpha was .78 for the standardized profile score in their study.

For this current study, modifications for measuring everyday memory among Taiwanese older adults were provided, based on the experience of the pilot study. The version B of the RBMT was used in this study because it contained an Asian-like photo in the testing of face recognition. In addition, because the test focused on name recall (not face identity), a Chinese name was substituted, but the photo of the person, as provided in the test materials, was left unchanged. The internal consistency efficiency was .65 for the screening score and .70 for the standardized profile score in this study.

Data Analysis

Prior to data analysis, entry errors, missing values, as well as statistical assumptions were examined to determine if any unexpected data appeared. First, the investigator checked 10% of the data randomly to rule out the possibility of data entry errors. Next, statistical summaries including range of scores, frequencies, histograms and

stem-and leaf were employed to detect any unexpected scores and to identify outliers from the errors of data entry.

Procedures for data analysis included: (a) using descriptive statistics (e.g., central tendency, dispersion, and shape of distribution) for demographics and major variables; (b) identifying outliers and influential cases (c) assessing internal consistency reliability for each instrument, HS, MIA, ME, and RBMT; (d) conducting an independent t-test for comparing gender differences among major variables; (e) using bivariate correlations for testing relationships among study variables; (f) employing hierarchical multiple regression to determine the influencing factors of memory performance. The level of significance was established at .05 for all statistical analyses. The statistical Package for the Social Sciences 14.0 (SPSS for Windows) was employed to analyze data collected for this study. Statistical analysis of the demographic data and of each research questions was presented.

All variables were individually examined for normality using skewness, histogram and normal probability plot. Positive skewness (skewness/skewness standard error > 2) for age was noted (Field, 2005; Munro, 2005). Likewise, negative skewness for metamemory achievement was found. However, using the criteria of Person's skewness coefficient, both variables were in an acceptable range (Munro, 2005). Thus, no transformations were made for any variables.

Analysis procedure for research questions

Question 1: What are the distinguishing characteristics of the demographics, health, metamemory, memory self-efficacy and memory performance among Taiwanese

older adults? Descriptive statistics (mean, standard deviation, and range) were used to obtain information on these variables. Findings of these characteristics helped the researcher gain insights into the representation of the sample.

Question 2: What are the gender differences in metamemory, memory efficacy and memory performance among Taiwanese older adults? An Independent t-test was employed for answering this question. Normal distribution of the dependent variable as well as a non-significant level of homogeneity of variance was evaluated in conducting the t-test.

Question 3: What are the relationships between demographics, metamemory and memory self-efficacy, and memory performance among Taiwanese older adults? Bivariate correlations were used to determine these relationships. Assumptions of correlational statistics including an independence of the sample, a normal distribution, the homoscedasticity, and linearity were examined prior to proceeding with data analysis.

Question 4: What factors predict memory performance among Taiwanese older adults while controlling for age, education and health? Two hypotheses are: metamemory is positively correlated with memory performance among Taiwanese older adults, and memory self-efficacy is positively correlated with memory performance among Taiwanese older adults.

Hierarchical multiple regression analyses were appropriate to evaluate the variance in memory performance, which can be explained by the independent variables. Prior to performing the multiple regression analyses, the data were checked to insure that they met the assumptions of multiple regression analyses. Assumptions for regression statistics were as follows. First, analyzing residuals can help to establish the normality of

variables. Methods include a stem-and leaf plot, a histogram and a Q-Q plot. Second, the data will be invalid if there is correlation between observations. A Durbin-Watson statistic is suggested to maintain the assumption of independence. The value closer to 2 is recommended, and should not exceed 3 or be less than 1 (Field, 2005). Third, a nonlinear relationship between the dependent and the independent variables will jeopardize the research findings. Assumptions of linearity can be examined by plotting residuals against the RBMT profile score. Fourth, homoscedasticity assumes that the distribution of the dependent variable has the same variance across the independent variables. Homoscedasticity can be determined by plotting residuals against the predicted values. Fifth, high correlations between variables greater than .85 indicate a problem of multicollinearity (Munro, 2005). Two measures of collinearity suggest that a variance inflation factor (VIF) greater than 10, and a tolerance statistic below .2 are problematic (Field, 2005). Last, values located beyond three standard deviations away from the mean as well as the values of the Cook's distance greater than 1, are considered outlines (Field, 2005).

Hierarchical multiple regression was adequate for answering this research question, because researchers can select predictors based on literature or their past work and can decide the order in which to enter predictors into the model (Field, 2005; Munro, 2005). This technique was useful in examining the effect of major variables on the outcome variable after controlling for the extraneous variables, which cannot be manipulated, such as age, gender or education. Researchers could decide the number of blocks as well as the numbers of variables within each block in accordance with the literature.

Protection of Human Subjects

Approval from the School of Nursing Departmental Review Committee and the Institutional Review Board of the University of Texas at Austin was obtained prior to the study's initiation. In addition, authorization letters from the participating centers were obtained and included in the Appendix. A cover letter, instead of a written consent form, was given to potential participants to maintain the voluntary nature of the study. Acceptance of the cover letter indicated an agreement to participate in this study. Each participant received 6 dollars for undertaking the interview.

The confidentiality of participants was respected. Individuals were informed that all information were be kept confidential and only used for statistical analysis, without published reference to any one individual's identity. Participants were to be linked to variables on the database through numeric identification codes. There was no personal identifying information available in the database. The questionnaires were kept in a locked file cabinet. Any identifying information would be destroyed at the earliest opportunity following completion of the study. Participation was voluntary, and did not affect their medical care if they were under any medical treatment.

There were no known risks; however, participants could have experienced some anxiety or discomfort as their level of memory performance was tested. There may not have been individual benefits for participants in this study. However, they may have acquired knowledge or awareness about their memory through participation in this study. Consequently, they would be likely to make efforts to improve their memory ability if they perceived their memory was not as good as it once had been.

Pilot Study

A pilot study was conducted during the summer of 2007 to evaluate the potential use of the translated instruments among Taiwanese older adults. The pilot study had three aims: (1) translate the Metamemory in Adulthood (MIA) from English to Chinese, and determine its psychometric properties; (2) evaluate all instruments' applicability with Taiwanese older adults; and (3) evaluate the process of data collection and the interview format.

Procedures for pilot study

Translation and Back Translation. The goal of translation has been to achieve cultural equivalence (Flaherty et al., 1988). After the approval for translating the Metamemory in Adulthood (MIA) from English to Chinese was obtained, two bilingual Taiwanese doctoral students, majoring in education independently, translated the MIA from English into Chinese. Their instructions were to maintain the meaning of the original English rather than to translate the exact wording. The researcher compared the two versions of the MIA-Chinese (MIA-C) and discussed with the two translators any aspects that were either unclear or needed modifications. Finally, an acceptable version of the MIA-C was obtained. Then, a Taiwanese-American student, who was a language major and not familiar with the MIA translated the MIA-C back into English (MIA-C-E). One American doctoral nursing student rated the MIA and MIA-C-E in order to obtain equivalence. The English speaker scored the words and phrases between the MIA and MIA-C-E on similarity using 3-point scales ranging from exact similarity (3), much similarity (2) to little similarity (1). The investigator met with the native speaker and discussed the problematic items to refine the meaning of questions. For example, the

question “I get upset when I cannot remember something” was not translated properly. There was no exact word for “upset” in Chinese so that the original translator translated it as “sad”, which is not agreeable to the semantic meaning of getting upset. Thus, “upset” was translated as “irritable” which is closer to the English meaning. Likewise, the question “I feel jittery if I have to introduce someone I just met”. There is no exact word for “jittery” in Chinese, and it was originally translated as “frustrated”; however, it was later changed to “nervous” for use in this study.

Additionally, three Taiwanese older adults living in the U.S. were invited to answer the MIA-C, to determine any ambiguity in words or phrases. They all indicated that they understood the questions except for minor wordings that seemed redundant or awkward to them. The investigator modified the wording or phrases based on their suggestions in order to reflect their interpretation of the questions.

Content validity. Five bilingual individuals, whose expertise was either memory-related or gerontological nursing, were invited to evaluate the content of the MIA-C. A 4-point Likert-type scale in a descending trend of “relevance”, ranging from 4 (*very relevant*) to 1(*not relevant*), was used to obtain Content Validity Index (CVI). Their ratings of the MIA-C were: Achievement (.81), Anxiety (.86), Capacity (.82), Change (.89), Locus (.89), Strategy (.89) and Task (.88). All of these ratings were at a level which was above satisfactory. In addition, these experts were asked to indicate the clarity of the MIA-C items. For example, one expert pointed out that the question “It does not bother me when my memory fails” was not translated correctly, because “memory fails” implied that individuals forgot to do something and did not imply a poor memory. This question was reworded as “it does not bother me when I forget to do something”. Moreover, one

expert raised awareness of the question “it is easier for most people to remember bizarre things than usual things”, because it sounded awkward to say “bizarre” in Chinese content. Therefore, “strange” may have been a better word to substitute for “bizarre”, although there was a degree of difference between these two words. The same expert reminded the investigator about the emotional connotation of English words like "upset", "proud", or "uneasy", that needed more care in translation in order to ensure the accurate content of questions. Items were modified according to the experts’ suggestions so that the final MIA-C was obtained.

Data collection. A convenience sample of 30 community-dwelling elderly persons in central Taiwan participated in this pilot study. They were recruited from a senior activity center which provided older adults with entertainment as well as formal classes. Inclusion criteria were: (1) an age of 65 years or older; (2) an ability to communicate orally or in writing; (3) availability to the researcher for one and a half hours of data collection; and (4) no terminal diagnoses. Examples such as heart failure, cancer, respiratory failure, renal failure, or any other conditions would have hindered an older adult from giving voluntary, informed consent or precluded their participation in this 90-minutes interview. These terminal conditions also impact on memory, and would therefore result in biased data. The investigator explained the purpose of the research to the interested participants. Acceptance of the cover letter indicated his or her agreement to take part in this study.

The interested participant was first screened for cognitive function and all 30 older adults met the requirement. They were either interviewed in the activity center or at their designated places. They all completed the information on demographics, Health

Scale, Memory Self-Efficacy, the Metamemory in Adulthood, and the Rivermead Behavioral Memory Test.

Data analysis. All data were analyzed by using SPSS. 14. Descriptive statistics including mean and standard deviation were used for continuous variables. Frequency analyses were applied to categorical variables such as gender and the screening test. The internal reliability of all instruments was assessed by Cronbach's alpha coefficient. Spearman rho was used to evaluate test-retest correlations of the MIA.

Findings of the pilot study

Sample characteristics. The mean age of this group of Taiwanese older adults was 79.61 (*SD* = 6.89), with average 9.27 years of education (*SD* = 3.41). Gender was equally represented in this sample. 17 people (56.7%) were married. Nine participants (30%) lived with their spouse, 8 people (26.7%) lived with their children, and 7 older adults (23.3%) lived with their spouse and children. 23 elderly (76.7%) indicated a cardio-related disease; hypertension was the most frequent reported disease. More than half of the participants rated their present health as being fair (53.3%), and 11 people reported that they were in good health (36.7%). In a comparison between their current health and that of three years ago, half of the participants (53.3%) reported that they were in the same state of health. Eighteen people (60%) indicated that their health problems did not prevent them from doing things they want to do. More then half of the participants (56.7%) reported that their health was better than most people of their age, indicating that these participants were healthy community dwellers. They evaluated their memory as average on a 7-point scale, ranging from very poor (1) to excellent (7) (*M* = 4.60, *SD* = 1.10).

Reliability of instruments. Cronbach's alpha was obtained for the subscales of the MIA: Achievement (α = .62), Anxiety (α = .84), Capacity (α = .89), Change (α = .87), Locus (α = .73), Strategy (α = .84) and Task (α = .89). The data in Achievement subscale were reviewed to probe any conditions that might explain their low reliability. Problems with the wording in translations may have explained some of the answers. For example, one of the question was "I think a good memory is something of which to be proud". The term "proud", although translated in accordance with its semantic meaning, implied a slight degree of arrogance in dialect. Thus, under the influence of Confucianism that stresses humbleness in life, older Taiwanese people tended to choose the opposite answer which yielded a lower score. To resolve this problematic translation, the term "honorable" in Chinese would be substituted for future use. Furthermore, on the questions which referred to "my friends often notice my memory ability" or "I often notice my friends' memory ability", Taiwanese older adults tended to choose the lower score indicating they did not know or they did not care about their friends' memory and vice versa. Therefore, the study of memory among Taiwanese older adults was of importance because they had not previously examined their own or their friends' memories. It was beneficial for them to raise their memory awareness.

Test-retest reliability was conducted with the MIA-C after two weeks from the initial assessment with thirteen people. Using the Spearman rho correlation coefficients (s_r), the results were: Achievement (s_r = .60, p <.05), Anxiety (s_r = .76, p < .01), Capacity (s_r = .90, p < .01), Change (s_r = .83, p < .01), Locus (s_r = .61, p < .05), Strategy (s_r = .86, p < .01) and Task (s_r = .85, p < .01). According to Strainer and Norman (2003), the reliability coefficient was certainly better when it exceeded .8; nevertheless, a reasonable

requirement for the stability of the instrument should have been greater than .5. Thus, all subscales were at an acceptable level.

The reliabilities of RBMT-profile and screening scores were .62 and .51. The test item on face recognition had the lowest mean score (M = 1.00, SD = .83). The possible reason for the low score on this item was the difficulty the Taiwanese older adults had in recognizing westerners' faces, which they felt were not distinctive in nature and color (they were all black and white photos). Indeed, at least three individuals reported that it was not easy to remember the westerners' faces. According to the test instruction, five seconds was given for each photo, and the respondents were asked to tell the gender or guess the age of the person on the photo in order to reinforce the recognition. However, some elders could not easily differentiate facial features.

The internal alpha of Self-rated Health Scale (SRHS) was .61. Low internal consistencies were found in Memory Efficacy-level (α = .28) and Memory Efficacy-confidence (α = .30). A critical reason for this low reliability was that this instrument actually measured two memory domains: prevention of memory decline by maintaining proper skills, and the use of general or specific strategy. Thus, it contrasted with the idea behind the measure of internal consistency (Streiner & Norman, 2003).

Evaluation of the process of data collection and interview format

Overall, the pilot study resulted in a satisfactory experience. Taiwanese older adults were eager to learn about their memories, their strategies, as well as their performances. Many of them felt that by investigating memory function, they could successfully maintain an independent life. However, several points were needed to strengthen the future interview process: (1) the version B of the RBMT containing an

Asian-look face was used; (2) a Chinese name was substituted in the test of name recall, but the photo of the person, as provided in the test materials, was not changed; (3) a large print response card was made, describing five choices, ranging from agree strongly to disagree strongly in order to help older adults choose the best answer in their mind; (4) a Memory Efficacy card ranging from 1 to 10, was made to assist the elderly population visualizing the choices; and (5) the investigator offered a short rest period, if anxiety or fatigue was noticed during the process, even if these particular participants feel obligated to complete the process in one sitting. They were assured that the interview will continue some other time.

To sum, efforts have been added in translating and pilot testing the instruments, in order to minimize cultural differences. The pilot study suggested the need for modifications in the wording of the MIA questionnaire and in the measurement scale of the ME. In particular, the experiences from the pilot study were valuable not only in examining the equivalence of instruments, but also in helping the investigator to learn to communicate effectively about the content of memory with participants who had never been exposed to this type of contact. The investigator also benefited from experiencing the field process.

Summary

This chapter described the rational for the research design in the study. Criteria for selecting the study participants as well as a detailed procedure for collecting data were provided. Psychometric properties for the selected instruments and the analytical methods for each research were reported. The protection for the research participants was taken

into account in the study. Findings from the pilot study supported the feasibility of this current research.

Chapter 4: Results

This chapter provides the data-processing procedures, and results of the descriptive and inferential analyses of the study variables, including demographics, health, metamemory, memory self-efficacy and memory performance among Taiwanese older adults. Findings for each research question are presented.

Description of the sample

A total of 134 participants initially agreed to participate in this study. Four of these, however, did not complete the interview. Thus, the final sample consisted of 130 community-dwelling older adults. All participants underwent mental status screening using the Short Portable Mental Status Questionnaire (SPMSQ) prior to the interview. 13.1% of them made two mistakes, 30.8% made one mistake, and the rest of them made no mistakes. Among these cognitive questions, the one the participants had the most difficulty in answering was "what is the day today?" 36.9% did not provide the correct answer. Another question that the participants found challenging was "what day of the week is it?"; 12.3% had trouble in answering the day of the week. Since none of the participants made more than two mistakes in the SPMSQ, they proceeded to the interview.

Research Questions

Question 1.

What are the distinguishing characteristics of the demographics, health, metamemory, memory self-efficacy and memory performance among Taiwanese older adults?

Demographic data

The demographic data for the participants is summarized in Table 3. The mean age for the sample was 71.76 (*SD* = 5.53) with a range from 65 to 88 years. The education level of this sample varied from 6 to 21 years. The mean years of education was 10.74 (*SD* = 3.76). 54.4% of the participants were male and 44.6% were female. The majority of the sample was married (70%), followed by widows or widowers (28.5%). Of the participants who were married, 32.3% lived with spouse only, and 31.5% lived with both spouse and children. Thirty three people lived with children only (25.4%), and 14 people lived alone (10.8%).

Table 3: Demographic Data

(N = 130)

Variables	Categories	n	%
Age in years	65-70 years	62	47.7
	71-75	38	29.2
	76-80	19	14.6
	> 81	11	8.5
Gender	Male	72	55.4
	Female	58	44.6
Marital status	Married	91	70.0
	Widow/Widower	37	28.5
	Divorced	1	0.8
	Single	1	0.8
Living Arrangement	With spouse	42	32.3
	With spouse/children	41	31.5
	With children	33	25.4
	Alone	14	10.8
Education	Elementary	34	26.2
	Junior high school	26	20.0
	Senior high school	30	23.1
	College	36	27.7
	Graduate school	4	3.1

Number of chronic illnesses. Older adults were asked to report any chronic illnesses diagnosed by healthcare professionals. Among those chronic conditions, hypertension was the most frequently reported illness (46.9%), followed by heart disease (10.8%), diabetes (10.8%), and arthritis (10%). Participants' chronic health conditions are shown in Table 4.

Table 4: Number of Chronic Illness

(N = 130)

Types	Frequency	%
Hypertension	61	46.9
Heart Disease	14	10.8
Diabetes	14	10.8
Lung problems	4	3.1
Stroke	1	0.8
Gastric ulcer	1	0.8
Cancer	3	2.3
Arthritis	12	10.0
Depression	2	1.5
Others	18	13.8
BPH	6	4.6
Gout	4	3.1
Allergy	2	1.5
Chronic sinus infection	1	0.8
Insomnia	1	0.8
Gall stone	1	0.8
Hemorrhoid	1	0.8
Low back pain	1	0.8
Hyperlipidemia	1	0.8
Tympanitis	1	0.8
Constipation	1	0.8
Herniated Intervertebral Disc	1	0.8

Descriptive Results for Instruments

According to the conceptual framework (see Figure 1.), major variables in this study included health, metamemory, memory self-efficacy and memory performance. The Self-Rated Health Subindex (SRHS) was used to measure the health status of the participants. Older adults' metamemory was evaluated with the 7 subscales of Metamemory in Adulthood (MIA). The measurement of memory self-efficacy was Memory Efficacy (ME). The outcome measure of this study, memory performance, was assessed with the Rivermead Behavioural Memory Test (RBMT). The descriptive statistical results for these instruments are reported in Table 5. Findings for each research question are described below.

Table 5: Descriptive Results for Instruments

Instruments	Possible scale range	Mean	SD	Item Mean (SD)
Health status				
SRHS	4-13	9.76	1.71	
Metamemory				
Achievement	16-80	61.28	6.58	3.83 (0.41)
Anxiety	14-70	42.97	8.81	3.11 (0.68)
Capacity	17-85	56.01	8.06	3.29 (0.47)
Change	18-90	45.76	9.59	2.54 (0.53)
Locus	9-45	31.07	4.21	3.45 (0.47)
Strategy	18-90	59.32	8.35	3.31 (0.48)
Task	16-80	62.90	4.82	3.93 (0.30)
Memory self-efficacy				
Level	0-4	3.56	0.79	
Confidence	0-40	26.03	8.99	
Evaluation	1-7	5.02	0.92	
Memory performance				
RBMT-SPS	0-24	17.65	4.24	
RBMT-SS	0-12	7.62	2.57	

Health Status. Taiwanese older adults' perception of health, measured by Self-Rated Health Status (SRHS), was reported in Table 6. The majority rated their present health as good, and the next largest segment reported theirs as fair. In comparison with their health 3 years ago, approximately half of the participants reported that their health remained the same (47.7%). Over one third of the participants felt that their health had declined in the previous 3 years.

Table 6: Self-Rated Health Status

Items	n	%	N = 130
1. How would you rate your health at the present time?			
Excellent	27	20.8	
Good	72	55.4	
Fair	30	23.1	
Poor	1	8	
2. Is your health now better, about the same, or not as good as it was three years ago?			
Better	16	12.3	
Same	62	47.7	
Not as good	52	40.0	
3. Do your health problems stand the way of your doing the things you want to do?			
Not at all	92	70.8	
A little	33	25.4	
A great deal	5	3.8	
4. Would you say that your health is better, about the same, or not as good as most people?			
Better	66	50.8	
Same	55	42.3	
Not as good	9	6.9	

Ninety-two people indicated that health problems did not interfere with their ability to do the things they wanted to do. One fourth of participants felt that their health problems impaired their ability to do things they desired. When asked to compare with their health to that of others in the same age category, almost the half of sample (50.8%) perceived their health to be better than others, and 55 people rated their health to be the same as others. This finding suggested that the participants in the study perceived their health positively. However, respondents found it difficult to answer the last question due to the uncertainty about whom to compare themselves to. For example, they felt their health may be better than those who require substantial assistance in daily activities, whereas their health may be worse than peers who are actively healthy elderly.

Metamemory. Metamemory was measured with the Chinese version Metamemory in Adulthood (MIA) scale. The MIA consists of 7 subscales: Achievement (the perceived importance of having a good memory and performing well on memory tasks), Anxiety (perceived anxiety relating to the circumstances requiring memory use), Capacity (perceived performance on given memory tasks), Change (the perception of memory abilities as generally stable or subject to long-term decline), Locus (personal control over remembering abilities), Task (knowledge of basic memory processes), and Strategy (a plan of action for situations requiring memory). A higher score on each subscale indicates a higher perception of memory knowledge and attitudes, except for the anxiety subscale. A higher score in anxiety means that the person is more anxious about situations requiring memory ability.

The findings on metamemory in elderly Taiwanese are illustrated in Table 5. The Task subscale had the highest mean score (M = 3.93, SD = 0.30) in metamemory. This

result suggests that participants had good knowledge of basic memory processes and functions, as evidenced by how most people would perform in given situations. However, a few respondents stated that they could not answer some questions in this subscale because the questions asked them to judge other people's attitudes, and they did not feel qualified to do so. One such question was “For most people, facts that are interesting are easier to remember than facts that are not.” As a result, these participants tended to choose “undecided” as their answer.

Respondents also indicated a high degree of motivation for performing well on memory tasks and perceived the importance of having good memory, as measured by the subscale of Achievement. Furthermore, they had or retained personal control over their own memory to a great extent (Locus), demonstrated sound knowledge in using of mnemonics and external memory aids (Strategy), and displayed a reliable knowledge of memory capacity (Capacity).

The Change subscale had the lowest mean score (M = 2.54, SD = 0.53) compared to other domains of metamemory. This result suggested that the participants in this study rated their memory as unlikely to stay the same as they grow older. In addition, elderly Taiwanese indicated a slight degree of anxiety involving memory tasks (M = 3.11, SD = 0.68).

Memory self-efficacy. Memory self-efficacy was measured with the 4-item Memory Efficacy (ME) scale. Memory Efficacy contains 2 parts: level and confidence. The mean score of ME-Level was 3.56 (SD = 0.79, range from 0 to 4,), suggesting that respondents were highly positive about their ability in a variety of memory tasks (see Table 5). A descriptive analysis for each question in memory self-efficacy –level is

presented in Table 7. One-hundred-and-five older adults (80.8%) believed they knew how to keep their memory from declining as they age. Some of them were aware of the potential for developing dementia, and therefore they maintained current information regarding the prevention of memory decline. 94.6% of participants (n = 123) were confident that they were finding ways to maintain their memory either by themselves or with others' help. Some respondents indicated that their spouses or children would provide information, strategies, or dietary supplements to help them preserve their memory function.

Almost all the older adults reported a willingness to use available methods to help retain their memories (97.7%). This result confirmed that respondents who perceived the importance of memory would work to sustain it. 83.1% of them responded that they had no problems getting someone to remember things for them if necessary, because their spouses or children could help them remember important dates or appointments.

Memory self-efficacy – Confidence. Using an item average where 0 means no confidence and 10 is 100% confidence in the memory tasks, 77% of older adults reported a moderate level of confidence in preventing memory from declining, indicated by an average score of slightly more than 5 points. Almost 90% of participants had at least a moderate level of confidence in finding ways to maintain their memory by themselves or with the help of others. Likewise, almost all Taiwanese older adults reported a moderate confidence that they would make an effort to use memory sustaining techniques if they knew any. One-hundred-seven people (82.2%) rated their confidence in getting someone to remember things for them as 5 points or higher on the scale.

Table 7: Memory Efficacy – Level and Confidence

Items	frequency (n)	%	Range	Mean (SD)
1. I know how to keep my memory from going downhill as I age.				
Level -				
Yes	105	80.8		
No	25	19.2		
Confidence -			0-10	5.54 (3.18)
2. I can discover ways either by myself or with the help of others to maintain my memory.				
Level -				
Yes	123	94.6		
No	7	5.4		
Confidence -			0-10	6.41 (2.33)
3. If I knew ways to keep my memory up, I would make an effort to use them.				
Level -				
Yes	127	97.7		
No	3	2.3		
Confidence -			4-10	7.03 (2.06)
4. If necessary, I would be able to get someone to remember things for me as I get older				
Level -				
Yes	108	83.1		
No	22	16.9		
Confidence -			0-10	6.84 (3.54)

This suggested two findings within memory self-efficacy in Taiwanese older adults. First, participants tended to choose point 5 on the 10-point scale for the first three items. The choice of 5 points for the first three items represented the largest portion within each item; they were 23.8%, 33.1% and 25.4%, respectively. Second, on item 4,

33.8% of older adults rated 100% confidence in finding someone to remember things for them as they age, making this the most frequent answer.

Memory evaluation. Using the question, "how good is your memory now?" The study asked subjects to evaluate their memory. The subjects rated their memory on a 7-point scale from 1 (*very poor*) to 7 (*excellent*). The mean score was 5.02 (*SD* = 0.92, range from 3-7), indicating they perceived their own memory as good. Forty-seven people (36.2%) rated their memory as good, followed by very good (n = 41, 31.5%) and average (n = 33, 25.4%).

Memory performance. Memory performance, the outcome variable in this study, was measured with the Rivermead Behavioural Memory Test (RBMT). There are 12 tasks in the RBMT and each task is scored on a scale from 0-2. The RBMT yields two scores: the Standardized Profile Score (SPS) and the Screening Score (SS). SPS ranges from 0-24 and the cut-off points for the level of memory function are: normal (22-24), poor memory (17-21), moderately impaired (10-16) and severely impaired (0-9). SS ranges from 0-12 and the cut-off points are: normal (10-12), poor memory (7-9), moderately impaired (3-6) and severely impaired (0-2). The summery of SPS and SS is presented in Table 8. The mean score for SPS was 17.65 (*SD* = 4.24), indicating that the average memory performance of study participants was in the category of poor memory. Over one third of the sample (43.1%) was categorized as having poor memory. Likewise, 41.5% of older adults were in the category of poor memory in the SS score.

Table 8: Rivermead Behavioural Memory Test (RBMT)

Scales	Mean (SD)	Range	n	%	(N = 130)
SPS -	17.65 (4.24)	6 - 24			
Normal			27	20.8	
Poor memory			56	43.1	
Moderately impaired			41	31.5	
Severely impaired			4	4.6	
SS -	7.62 (2.57)	1-12			
Normal			34	26.2	
Poor memory			54	41.5	
Moderately impaired			49	30.8	
Severely impaired			2	1.5	

The results for each task in the RBMT - SPS are summarized in Table 9. Immediate route (remembering a route in a room tested immediately after the instruction) had the highest mean score (M = 1.73, SD = 0.59), indicating most participants did well on this task, followed by delayed route (subjects are asked to perform the previous route after a delay) (M = 1.67, SD = 0.64) and picture recognition (recognizing previously presented pictures of familiar objects and distinguishing them from newly added distracter items) (M = 1.64, SD = 0.67). Additionally, many elderly Taiwanese adults obtained a perfect score on immediate route (80.8%), delayed route (76.2%) and picture (74.6%). However, facial recognition (recognizing unfamiliar photographs of faces tested with distracters after minutes) had the lowest mean score (M = 1.15, SD = 0.85) compared with other tasks, suggesting that the older adults in this study had the most difficulty in performing this task.

In addition, three tasks involving prospective memory (remembering to do something in the future) need special attention. The tasks were: belonging (remembering

to ask for a return of a personal belonging which is being held until the test session is finished), appointment (remembering to ask about an appointment in response to a cue as the sound of a kitchen timer) and message (remembering to deliver a message in a particular spot while walking in the room). Among these tasks, older adults seemed to have the hardest time remembering the appointment set previously (*M* = 1.27, *SD* = .73).

Table 9: Rivermead Behavioural Memory Test (RBMT) – SPS

Items	Mean (SD)	Correct % (2points) N = 130
Names	1.36 (0.78)	54.6
Belonging	1.40 (0.77)	57.7
Appointment	1.27 (0.73)	43.8
Pictures	1.64 (0.67)	74.6
Immediate story	1.55 (0.69)	66.9
Delayed story	1.63 (0.65)	72.3
Faces	1.15 (0.85)	44.6
Immediate route	1.73 (0.59)	80.8
Delayed route	1.67 (0.64)	76.2
Message	1.36 (0.80)	56.2
Orientation	1.48 (0.74)	62.3
Date	1.40 (0.79)	59.2

Question 2.

What are the gender difference in demographics, metamemory, memory self-efficacy and memory performance among Taiwanese older adults?

Independent t-tests were conducted to explore gender differences in age, education, health, memory self-efficacy, metamemory and memory performance (see Table 10). The inflation of Type I error due to the analysis of multiple t-tests was taken into account in this study (Field, 2005). Multivariate Analysis Variance (MANOVA) was

initially used to control for the familywise error rate. However, since the results of MANOVA were the same as the individual t-test, the findings of the t-test were reported in this study. The men were significantly older (t = -2.21, p < .05, d = .39), more educated (t = -2.18, p < .05, d = .39), and more confident with their memory (t = -3.37, p < .01, d = .60) than women. Moreover, male older adults rated their present state of memory to be significantly better than female participants did (t = -2.93, p < .01, d = .51). Although the following results were not statistically significant, elderly men perceived their health to be better than women did, despite the fact that they had greater numbers of chronic illness. Male participants rated themselves as more knowledgeable about basic memory process and memory capacity. They also displayed more memory anxiety, strategy use and better memory performance.

To further explore gender differences in memory performance, the 12 tasks of Rivermead Behavioural Memory Test (RBMT) were analyzed (see Table 11). Two tasks, orientation and date, contradicted the assumption of equality of variances. Thus, values for the two tasks were reported from "Equal variances not assumed". Among these tasks, men were significantly better in orientation (t = -3.31, p < .01, d = .59) and date (t =-2.26, p < .05, d = .40) than women.

Table 10: Gender Differences by Study Variables

Variables	Female n = 58	Male n = 72	t	p	d*
Age					
Mean (SD)	70.59 (5.31)	72.71 (5.56)	-2.21	.029	.39
Education					
Mean (SD)	9.95 (3.50)	11.38 (3.87)	-2.18	.031	.39
Number of chronic illness					
Mean (SD)	0.97 (.77)	1.07 (.94)	-.68	.499	.12
Health staus					
Mean (SD)	9.66 (1.70)	9.90 (1.79)	-.80	.425	.14
Achievement					
Mean (SD)	3.83 (.41)	3.83 (.42)	-.002	.999	.00
Anxiety					
Mean (SD)	3.02 (.64)	3.17 (.71)	-1.19	.236	.21
Capacity					
Mean (SD)	3.26 (.48)	3.33 (.47)	-.82	.415	.14
Change					
Mean (SD)	2.60 (.53)	2.50 (.54)	1.06	.289	.19
Locus					
Mean (SD)	3.46 (.47)	3.44 (.46)	.21	.835	.04
Strategy					
Mean (SD)	3.26 (.47)	3.35 (.48)	-1.09	.236	.19
Task					
Mean (SD)	3.90 (.31)	3.95 (.29)	-.89	.378	.15
Memory efficacy-confidence					
Mean (SD)	22.86 (8.30)	28.29 (9.47)	-3.37	.001	.60
Memory evaluation					
Mean (SD)	4.76 (.92)	5.22 (.88)	-2.93	.004	.51
Memory performance					
Profile - Mean (SD)	17.05 (4.12)	18.13 (4.31)	-1.44	.153	.25
Memory performance					
Screening – Mean (SD)	7.31 (2.41)	7.86 (2.69)	-1.22	.227	.21

* Cohen's d effect size

Table 11: Gender Differences in Memory Performance

Tasks	Female n = 58	Male n = 72	t	p	d*
Names Mean (SD)	1.34 (.72)	1.38 (.83)	-.22	.827	.05
Belongs Mean (SD)	1.36 (.81)	1.43 (.75)	-.50	.618	.09
Appointments Mean (SD)	1.24 (.80)	1.29 (.68)	-.39	.700	.07
Pictures Mean (SD)	1.57 (.73)	1.69 (.62)	-1.06	.291	.18
Immediate story Mean (SD)	1.50 (.73)	1.60 (.67)	-.79	.429	.14
Delayed story Mean (SD)	1.59 (.70)	1.67 (.61)	-.70	.484	.12
Faces Mean (SD)	1.24 (.87)	1.08 (.84)	1.06	.293	.18
Immediate route Mean (SD)	1.71 (.62)	1.75 (.58)	-.41	.683	.07
Delayed route Mean (SD)	1.62 (.67)	1.71 (.62)	-.78	.440	.14
Message Mean (SD)	1.41 (.77)	1.32 (.82)	.87	.505	.11
Orientation Mean (SD)	1.24 (.80)	1.67 (.63)	-3.31	.001	.59
Date Mean (SD)	1.22 (.86)	1.54 (.71)	-2.26	.026	.40

Cohen's d effect size

Question 3.

What are the relationships between demographics, metamemory, memory self-efficacy and memory performance among Taiwanese older adults?

Bivariate correlation was conducted to test the relationships among the study variables. The reliability of Memory Efficacy – Level raised a concern in the analysis. First, it was not satisfactory according to Cronbach's $\alpha = .53$. Furthermore, Bandura (2005) claimed that the level of the self-efficacy measurement is generally less sensitive and informative than that of efficacy strength (confidence). Thus, only memory self-efficacy confidence was entered into correlational analysis. In addition, the dependent variable, the RBMT standardized profile score (SPS) and screening score (SS) were highly correlated ($r = .95$, $p < .001$). The standardized profile score was selected as the illustration of memory performance rather than screening score, because the estimation of memory performance through the standardized profile score was more reliable (Wilson, Cockburn, Baddeley, & Hiorns, 2003).

Another consideration was related to the intercorrelations within the MIA. The subscales of Change, Capacity, and Locus were highly correlated ($r = .63$ to $.68$). However, since this was the first time the MIA was used in the study population, all subscales were entered into the equation, to investigate their effects on the outcome variable, which was memory performance. Correlation coefficients of the analysis were shown in Table 12.

Table 12: Bivariate Correlations among All Study Variables

(N = 130)

	1	2	3	4	5	6	7	8	9	10	11	12
1.Age	1.00											
2.Gender	.19*											
3.Education	- .07	.19*										
4.Health status	- .09	.07	.16									
5.Achievement	- .08	.00	.13	.04								
6.Anxiety	- .06	.11	.07	-.01	-.02							
7.Capacity	- .09	.07	-.01	.07	.44**	-.22*						
8.Change	- .11	-.09	-.01	-.05	.30**	-.45**	.63**					
9.Locus	- .11	-.02	.07	.03	.42**	-.40**	.65**	.68**				
10.Strategy	- .14	.10	.33**	.15	.39**	.05	.24**	.10	.28**			
11.Task	- .06	.08	.33**	.22*	.27**	-.02	.23**	.01	.29**	.44**		
12.MSE [a]	- .18*	.29**	.38**	.38**	.24*	.11	.35**	.23**	.21*	.33**	.29**	
13.Memory[b]	- .41**	.13	.56**	.44**	.24**	.08	.21*	.12	.12	.39**	.32**	.59**

Note. [a] Memory Self-Efficacy. [b] Memory Performance.
* < .05, ** <.01

Demographics, health, metamemory and memory efficacy. Age was significantly correlated with gender ($r = .19$, $p < .05$), indicating male participants were older than their female counterparts. Men had more education ($r = .19$, $p < .05$) and higher memory self-efficacy ($r = .29$, $p < .01$) than women. Education was positively correlated to memory self-efficacy ($r = .38$, $p < .01$), metamemory strategy ($r = .33$, $p < .01$) and task ($r = .33$, $p < .01$), indicating that the higher the education subjects had achieved, the more confidence they would have in their memory, and the better knowledge they would have in strategy use and basic memory process.

Perceived health status showed a significantly positive relationship with task ($r = .22$, $p < .01$), and memory self-efficacy ($r = .38$, $p < .01$) Older adults who perceived their health was better tended to have better memory knowledge, higher memory efficacy and better memory evaluation.

Metamemory variables interrelationship. Achievement was significantly correlated with capacity ($r = .44$, $p < .01$), change ($r = .30$, $p <. 01$), locus ($r = .42$, $p < .01$), strategy ($r = .39$, $p < .01$), task ($r = .27$, $p < .01$) and memory self-efficacy ($r = .24$, $p < .01$). Subjects who valued the importance of having a good memory perceived their memory to be stable over time, had more personal control over memory, and had better knowledge of memory strategy and process. Anxiety was inversely related to capacity ($r = -.22$, $p < .05$), change ($r = -.45$, $p < .01$) and locus ($r = -.40$, $p < .01$). The higher the level of anxiety, the more likely the participants were to have less knowledge of memory capacity, less stability of memory and less personal control. Capacity had a significant correlation with change ($r = .63$, $p < .01$), locus ($r = .65$, $p < .01$), strategy ($r = .24$, $p < .01$), and task ($r = .23$, $p < .01$). Older adults who had a more positive perception of their

memory performance had more stability of memory over time, more personal control over their memory, more use of memory mnemonics, and more knowledge of typical performance for a given task. Locus was positively correlated with change ($r = .68$, $p < .01$), strategy ($r = .28$, $p < .01$) and task ($r = .29$, $p < .01$). Those who had higher personal control over memory tended to perceive the stability of memory with increasing age, to know more memory strategy use in a given task, and to have better memory knowledge. Finally, older adults who had better knowledge about memory process would use more memory strategy ($r = .44$, $p < .01$).

Metamemory and memory efficacy. A few significant relationships were found between metamemory subscales and memory self-efficacy. Achievement, capacity, change, locus, strategy and task were correlated with memory self-efficacy ($r = .24$, $r = .35$, $r = .23$, $r = .21$, $r = .33$, $r = .29$, $p < .05$, respectively).

Study variables and memory performance. Age and education were significantly related to memory performance ($r = -.41, .56$, $p < .01$, respectively), although they displayed different relationship directions. The greater the subject's age, the more likely his/her memory performance was to be lower, whereas the higher the level of the subject's education, the higher his/her memory performance was likely to be. Health, metamemory and memory self-efficacy were also found to be significantly correlated with memory performance (see Table 12). The research findings suggested that older adults who perceived themselves as having good health tended to do well on memory performance ($r = .44$, $p < .01$). Moreover, participants who recognized the importance of having a good memory and were more knowledgeable on memory capacities, memory

process and strategy use, tended to display better memory performance (r = .21 to .39, p < .05). Memory self-efficacy was positively related to memory performance (r = .59, p < .01). The higher the older adults' memory efficacy was, the better their memory performance.

Question 4.

What factors predict memory performance among Taiwanese older adults after controlling for age, education, and health? Two hypotheses were: 1) Metamemory is positively correlated with memory performance among Taiwanese older adults, 2) memory self-efficacy is positively correlated with memory performance among Taiwanese older adults.

To understand the factors affecting Taiwanese older adults' memory performance, a hierarchical regression analysis was conducted. Certain assumptions of the regression analysis were examined in order to adequately interpret the results that could be generalized to the population. The assumption of normality was tested with a histogram and Q-Q plot of residuals. The Q-Q plot showed that the residuals lay on a straight line, indicating that the normality assumption was met. The independence assumption was met with the Durbin-Watson value, 1.94 (the closer to 2, the better indication of uncorrelated residuals) (Field, 2005). The linearity and homoscedasticity assumptions were checked with the plot of standardized residuals against standardized predicted values (Field, 2005). The residuals of this study were distributed evenly and randomly throughout the plot. There were no influential cases identified. All values were located within three standard deviation of the mean, and the values of Cook's distance were less than 1.

Multicollinearity is an important issue for the regression analysis. The variances of the regression coefficients are likely to increase due to multicollinearity, resulting in an unstable prediction equation (Stevens, 2002). A Variance Inflation Factor (VIF) greater than 10 or tolerance statistic below .1 indicates that multicollinearity is a concern. None of the predictors in this study had VIF values greater than 10 or tolerance statistics less then .1.

Hierarchical regression analysis was used to answer the research question. The order of entering predictors was based on the conceptual framework of this study. The predictors were entered into regression analysis in three steps by enter method. Age and education were controlled for by entering them as the first set (model one). Next, perceived health was added as the second set. The last set of predictors included memory self-efficacy and all metamemory subscales (achievement, anxiety, capacity, change, locus, strategy and task). Results are shown in Table 13.

In model 1, age and education both were the predictors that significantly correlated with memory performance, accounting for 45% of the variance. The older the participants were, the lower their memory performance. In contrast, those who had higher levels of education had better memory performance.

In model 2, health status was added into the analysis, collectively accounting for 56% of variance in memory performance. Both age and education remained significant predictors for the outcome measure. Perceived health status was a significant predictor of memory performance. They improved the amount of variance accounted for by 11%, changing the R^2 from .45 to .56 ($p < .001$). Participants who perceived better health status tended to perform better in memory tasks.

Table 13: Hierarchical Multiple Regression for Memory Performance

Model	predictors	B	SE	β	t	R-square (R^2)	Adjusted R^2	R^2 Change
Model 1						.45	.45	
	Age	-.29	.05	-.38	-5.73***			
	Education	.60	.07	.53	8.14***			
								.45***
Model 2						.56	.55	
	Age	-.27	.05	-.35	-5.88***			
	Education	.55	.07	.48	8.06***			
	Health status	.82	.15	.33	5.51***			
								.11***
Model 3						.65	.62	
	Age	-.23	.04	-.31	-5.45***			
	Education	.42	.07	.37	5.90***			
	Health status	.59	.14	.24	4.02***			
	Memory self-efficacy	.11	.03	.24	3.29**			
	Achievement	.78	.68	.08	1.16			
	Anxiety	-.04	.41	-.01	-.09			
	Capacity	.67	.74	.08	.91			
	Change	.59	.71	.08	.84			
	Locus	-1.50	.80	-.17	-1.87			
	Strategy	.81	.60	.09	1.34			
	Task	.39	.95	.03	.41			
								.09**

**p < .01, ***p < .001 (2-tailed)

In the last model, metamemory and memory efficacy were added to test the effect of these factors. Only memory efficacy was significantly related to performance ($p <$ .001), improving the amount of variance accounted for by 9%. Those who had higher memory efficacy had better memory performance. Collectively, age, education, perceived health, memory efficacy and metamemory explained 65% of memory performance

variance in Taiwanese older adults.

Results of two hypotheses proposed in this study were provided. The hypothesis that metamemory is positively correlated with memory performance was not supported. The second hypothesis that memory self-efficacy is positively correlated with memory performance was supported in the current study.

Summary

A total of 130 community-dwelling Taiwanese older adults participated in this study. Their average age was 71.76 years and they had an average of 10 years of education. Males outnumbered females. The majority of the participants were married and lived with their families. 70% of the subjects reported having at least one type of chronic illness, of which hypertension was the most frequently mentioned. Overall, the subjects rated their health status as "good", with an average rating of 9.76 out of a possible 13.

Older adults' memory knowledge and attitudes, namely metamemory, showed the highest mean score on the task subscale, indicating these participants had a fairly good understanding of basic memory processes. In addition, they recognized the importance of having a good memory and indicated that they wanted to perform well on memory tasks, which resulted in a fairly high achievement score. However, Taiwanese older adults tended to perceive that memory was likely to decline with age, which was indicated by the change subscale having the lowest score.

In the discussion of memory self-efficacy, older adults in this study were moderately confident in their memory. They considered a good memory to be important

and indicated that they would work to this end if they knew what methods to use to do so. They were also moderately confident with being able to get someone to help them remember things if necessary. In general, participants reported that they had good memory quality, as indicated by their responses to the question "How good is your memory now?" There were differences in the age of participants, education levels, and memory self-efficacy according to gender. Men tend to be older, to have more education and to have higher memory self-efficacy than women.

When memory was evaluated objectively, the average performance fell into the poor range. However, approximately 75% did well on tasks such as route learning and object recognition. They had difficulty identifying non-Asian faces and recalling the time of an appointment. In general, memory performance was likely to decline with increasing age. In contrast, better memory performance was correlated with the higher education, better health status, better memory knowledge and memory self-efficacy. For memory performance, age and education collectively explained 45% of variance. After adding the health factor, 56% of the variance was accounted for. With the addition of metamemory and memory self-efficacy, the variance accounted for was increased from 56% to 65%.

Chapter 5: Summary and Discussion

This chapter provides a summary of this study and discusses issues related to research findings, the sample and the methodology. This chapter suggests implications and recommendations for nursing research, education and practice.

Summary of the study

This cross-sectional, descriptive, correlational study had four aims. They were: (a) to describe the characteristics of metamemory, memory self-efficacy and memory performance in Taiwanese older adults 65-years of age and older; (b) to examine gender differences in metamemory, memory self-efficacy and memory performance; (c) to determine the relationships between individual characteristics and metamemory, memory self-efficacy and memory performance; and (d) to identify predictors of memory performance in the study population.

A nonprobability sample of 130 participants was recruited from three senior citizen activity centers in a city located in central Taiwan. Inclusion criteria for Taiwanese older adults were: (a) they were of age 65 years or older; (b) they had an ability to communicate orally or in writing; (c) they were available to the researcher for one and a half hours of data collection; and (d) they had no terminal diagnoses. Examples such as heart failure, cancer, respiratory failure, renal failure, or any other conditions would have hindered an older adult from giving voluntary, informed consent or precluded their participation in this 90-minutes interview. A cognitive screening test before the interview ensured that participants were able to understand and provide consent. All participants made no more than two errors on the Short Portable Mental Status Questionnaire (SPMSQ) and, therefore, proceeded to the interview. The period of data

collection was from December 2007 through February 2008. All interviews were conducted either in one of the sites or in the participant's designated place.

The proceeding of the interview began with the demographic questionnaire, followed by the Self-Rated Health Subscale for measuring perceived health status, the Memory Efficacy (ME) for measuring memory self-efficacy and the Metamemory in Adulthood (MIA) for measuring metamemory. Finally, the investigator assessed the participant's actual memory performance by the Rivermead Behavioural Memory Test (RBMT).

Discussion of Findings

The following section examines the results of three constructs of this study-- metamemory, memory self-efficacy and memory performance-- as they apply to previous research. The relationship between individual characteristics and three constructs are also provided.

Metamemory

Participants in this study demonstrated that they had fairly good knowledge of memory processes and motivation to perform well on memory tasks. They also reported a good memory capacity, personal control over their own memory, and knowledge of the use of memory strategy. These findings were consistent with research conducted in a western society (McDougall, 1998, 2003, 2004). Although Taiwanese older adults reported that they had fairly good knowledge and attitudes about their memory, they perceived their memory had declined over time. This finding was congruent with other studies (McDougall, 1998, 2003, 2004). The reason for this perception of memory decline may have been due to some questions in the Change subscale of MIA, which

asked the subjects to compare their perceived memory status with their status from ten years previously. Not surprisingly, a span of ten years in memory could have made a lot of difference for some older adults, which resulted in the perception of declining memory as they got older.

In a comparison of metamemory in Taiwanese and Japanese older adults, they all tended to perceive the importance of having good memory and were motivated to perform well in memory tasks (Achievement); however, all participants perceived that their memory declined with increasing age (Change) (Ide, et al., 1999). Although Japanese older adults tended to have lower personal control over memory (Locus) and less mnemonic usage (Strategy) than those of Taiwanese older adults, this could have been attributed to a great age difference between the two groups. Japanese participants were mostly octogenarians, whereas the average year of age for Taiwanese older adults were approximately eleven years younger than those elderly Japanese. In addition, the difference in the living arrangement (nursing facility vs. community) may have played an important role. The assistance in daily activities provided for Japanese elderly in a nursing facility may have had an impact on residents' personal control and strategy use in memory tasks. Research findings suggested that community-dwelling elders reported a higher locus of control over their memory and greater use of memory strategy than nursing home residents (Liu & McDougall, 2006).

The relationship between individuals' background information and metamemory was noteworthy. Age was not related to metamemory in this study, and this was consistent with a Japanese nursing home study (Ide et al., 1999). However, age was shown to be inversely related to the stability of memory over time (McDougall, 2004). As

the subjects grew older, the likelihood of perceiving a stable memory decreased. Earlier studies suggested that older adults reported having had less memory capacity, that their memory had declined over the years, and that they believed there was not much they could have done to enhance their memory or prevent its deterioration compared with younger adults (Dixon & Hultsch, 1983b; Hultsch et al., 1987; Loewen et al., 1990; Ponds & Jolles, 1996). Nevertheless, older adults reported better knowledge about their remembering abilities (Hultsch et al., 1987), greater motivation in performing well on memory tasks than younger adults (Ponds & Jolles, 1996), and more use of memory strategy (Ponds & Jolles, 1996).

This study indicated that education was positively related to the use of memory strategy and the knowledge of memory process, conclusions that were supported by other studies (Ponds & Jolles, 1996; McDougall, 2004). Thus, older adults were encouraged to maintain an active lifestyle, which included various types of cognitive stimulation, enabling them to develop memory strategies and helping them to continue living independently.

In a discussion of health status and metamemory, Taiwanese older adults who perceived a better health status had a better knowledge of basic memory processes. Moreover, researchers found that individuals with higher health ratings had higher memory capacity, more stable memory and less anxiety about memory tasks (Ponds & Jolles, 1996). Ide and colleagues (1999) reported that elderly Japanese who perceived their own health as better, also believed that they had less personal control over their memory and that their memory was subject to long-term change. Although the results of

the Japanese study were different from others, this may have been due both to the different sample population and to the living environment of the subjects.

This study did not find a relationship between gender and metamemory, which was congruent with a study conducted with 169 community-dwelling older adults in the U.S. (McDougall, 1998). However, Japanese older women showed a greater motivation than men to do well on memory tasks (Ide, et al, 1999). Researchers suggested that women reported greater motivation for memory tasks, more strategy use, and greater anxiety during memory-demanding situations than men (Hertzog et a;., 1990b; Hultsch et al., 1987). Similar findings disclosed that women had higher scores on memory capacity, strategy use and anxiety than men (Ponds & Jolles, 1996).

Memory self-efficacy

Taiwanese older adults were at least moderately confident about their own memory. They were confident about how to prevent memory decline, to maintain memory, and to use general memory strategy or to use someone else as part of their memory strategy. One possible reason for this finding may have stemmed from the fact that elderly Taiwanese have become aware of the issues concerning memory in old age, due to widespread media reports about the existence of dementia in Taiwan in recent years. Some aspects of these findings had contrasting results for elders living in an assisted living facility (McDougall, 1998). Those older adults had less confidence in preventing memory decline and in using someone as a memory strategy. A possible explanation for this discrepancy was due to the living environments and cultural differences among the adults. Participants in this study were community-dwelling elderly who were still, to some degree, actively involved with social or intellectual activities. By

contrast, older adults who resided in an assisted facility were less likely to use their memory.

Cultural differences may have influenced the perception of memory self-efficacy in older adults. For example, the question measuring memory self-efficacy was stated as "If necessary, I would be able to get someone to remember things for me as I get older". Surprisingly, 33.8% of the Taiwanese older adults rated 100% confidence in finding someone to remember things for them as they aged. This finding may have been fundamentally due to the fact that 89.2% of the sample lived with their families. Indeed, some older adults reported no worries in finding someone to remember things for them, because either their spouse or their children could do so. Taiwan is a family-oriented culture, and there is a greater frequency of coresidence among Taiwanese older adults than there is for elders in Western societies. These culture differences may have had an impact on the interpretation of older adults' memory self-efficacy measured by the Memory efficacy (ME) instrument. Thus, investigating memory self-efficacy in a collectivist-orientated culture will be of interest for future research.

Theoretical concerns of Western constructs transferred to Eastern cultures

Bandura's self-efficacy to collective efficacy. Self-efficacy emphasizes personal control, as expressed by Bandura's argument that "people guide their lives by their beliefs of personal efficacy" and that "beliefs of personal efficacy constitute the key factor of human agency" (Bandura, 1997, p. 3). Although this belief was firmly seated in a Western individualist context, Bandura (1997) rejected the notion that self-efficacy is less important in collectivist cultures such as Taiwan. He argued that "people live their lives neither entirely autonomously nor entirely interdependently in any society. They do

things independently but must also work together to achieve desired results. Interdependence does not obliterate a personal self" (1997, p.32). That people may have had lower efficacy beliefs in a particular culture group, he argued, did not necessarily indicate that efficacy was less important for that group. Indeed, self-efficacy is also valued in such collectivist cultures, because the individual cannot entirely rely on someone else. The difference between individualist and collectivist cultures with respect to self-efficacy is one of degree, rather than of kind.

Bandura has expanded his idea of self-efficacy to include a group-level efficacy which is labeled *collective efficacy* (1997, p. 477). Collective efficacy was defined as "a group's shared belief in its conjoint capabilities to organize and execute the courses of action required to produce given levels of attainments" (1997, p. 477). Collective efficacy focused on a group's capabilities. The effect of group functioning depended upon the qualities and levels of interaction and of dynamics among its members. Therefore, Bandura claimed that "perceived collective efficacy is an emergent group-level attribute rather than simply the sum of the members' perceived personal efficacies" (1997, p. 478).

Self-efficacy and Taiwanese older adults. To date, there has been minimal scholarly attention directed toward self-efficacy in Taiwanese older adults, let alone memory self-efficacy. When conducting research on self-efficacy in Taiwanese elderly, researchers should bear in mind the influence of Chinese philosophies and religions. For example, Confucianism constituted the most significant influence on Chinese culture (Chae, 1987; Chen, 2001), and Chinese older adults believed that essential to their happiness and health was the respect of their children (Chen, 2001; Chen, 1996). The Chinese held strong beliefs and values related to family; thus, the sense of collectivity

was valuable in Chinese culture because it strengthens the family (Chen, 2001). For instance, Taiwanese elders perceived "companionship" as a motivator for engaging in health promotion activities (Chen, 2003). Thus, adapting "social persuasion", one of Bandura's sources of self-efficacy, can have played an important role in studies of Taiwanese older adults, because of the encouragement received from companions.

Self-efficacy can be a powerful factor in collectivist cultures. Wu, Tang, and Kwok (2004) found self-efficacy to be a significant predictor of psychological distress for elderly Chinese women with chronic illness, suggesting that the higher the level of their self-efficacy, the lower the degree of their psychological distress. Additionally, Chinese older adults who possessed greater self-efficacy were more likely to adopt preventive respiratory behaviors (Tang & Wong, 2005), and perceived themselves as having a better quality of life (Leung, Wu, Lue, & Tang, 2004). In addition, the likelihood of older adults living alone has been increasing in Taiwan, particularly in urban areas, where more young couples have preferred to live independently. Thus, Taiwanese older adults may have exerted a higher level of confidence in learning certain tasks that could have allowed them to remain independent and, consequently, to decrease their psychological distress.

In discussing the relationship between memory self-efficacy and metamemory, those elderly Taiwanese in this study who reported higher confidence in their memory also had higher motivation on memory tasks, greater memory capacity, greater stability of memory, higher personal control, greater memory usage, and better memory knowledge. McDougall (2004) found that memory self-efficacy was positively related to

memory capacity, to memory stability over time and to personal control, but it was inversely related to anxiety.

Elderly males were more confident with their memory than females in this study. In contrast, McDougall (1998) found that females were more confident about their memory than males. Nevertheless, Suen (2000) reported no differences between gender and memory self-efficacy in Taiwanese American older adults.

The indication of a decrease in memory self-efficacy with increasing age in this study was consistent with Suen's (2004) study. Likewise, researchers reported that the belief in memory decline with increasing age was more prevalent in older adults than among younger adults (McDougall, 1995; West & Berry, 1994). Growing old can have both positive and negative connotations, such as wisdom versus senility. Whether this belief is from age stereotypes or from other factors needs further investigation. However, some studies showed that there was no significant relationship between age and memory self-efficacy (McDougall, 2004).

Additionally, Taiwanese older adults with increasing years of education tended to have greater levels of memory self-efficacy. This result has been supported by others (McDougall, 2004; Suen, 2000).

Memory performance

Taiwanese older adults' memory performance was categorized in the range of poor memory, as measured by the RBMT. McDougall (2003, 2004, 2007) reported a similar pattern of memory performance for Caucasian older adults; nevertheless, elderly African Americans tended to have moderately impaired memory in the same measure.

This study did not find any difference between the sexes in total memory performance. Research findings regarding gender and memory performance have been inconclusive, depending on the types of methodology and measures. Taiwanese immigrant older men in the U.S. performed better than women in everyday memory tasks (Suen, 2000). That finding could be possibly inferred from the large differences in education levels between genders. In Suen's (2000) study, education was significantly correlated with memory performance, and 63.8% of the female participants had high school and above education, whereas 92.5% of the males had the same level of education. Thus, men were more likely to do well on the performance test than women based on the correlational data.

A further exploration of gender in memory performance revealed that elderly Taiwanese men did better than females on the task of orientation and date. The possible reason for the difference in orientation may have stemmed from the two underlying questions: "Who is the Prime Minister in Taiwan?" and "Who is the President of the United States?" Men tend to have more political efficacy, interests and awareness than women (Verba, Burns, & Schlozman, 1997), which may result in men's capability in answering this type of question. Furthermore, the person holding the current post of Prime Minister in Taiwan has changed six times in the past eight years. It is not easy to keep up with these names unless an individual is politically aware of the issues.

In addition, the difficulty of Taiwanese older women in remembering the date may possibly have been due to the different calendar system used in Taiwan. Some women, especially older women, tended to use this type of calendar for remembering specific dates for religious observances. Thus, older women might utilize the regular

calendar less often than men. The meaning of dates may also be different for women than it is for men. A similar finding was represented in Taiwanese immigrant older adults. Male participants did better on the orientation task than their female counterparts (Suen, 2000).

Metamemory and memory performance. In the present study, older adults who were motivated to perform better in memory tasks, had greater memory capacity, were capable of using more mnemonics and had better memory knowledge, also had better memory performance. Research findings also suggested that having better memory knowledge was indicative of a better memory performance (McDougall, 2004). In addition, an earlier study showed that metamemory was moderately related to the text performance across three samples (Dixon & Hultsch, 1983a).

Metamemory did not appear to be a significant predictor for performance in this study, which is consistent with McDougall's (2004) study. The possible explanations were the intercorrelations among the subscales of metamemory and other variables such as age, education and health, which may have influenced the relationship between metamemory and memory performance. Nevertheless, another study indicated task (knowledge of memory processes), achievement (motivation regarding memory) and locus (perceived personal control over memory) were the most important predictors for older adults in the text recall performance (Dixon & Hultsch, 1983a). Jonker and colleagues (1997), examining metamemory and three memory functions, found that the motivation for and anxiety over the memory tasks contributed largely to memory functions in older adults. Yet, the differences of metamemory components in predicting memory performance may vary depending upon the sample population.

Memory self-efficacy and memory performance. Older adults with higher memory self-efficacy displayed a better memory performance in this study. This finding has been supported in substantive literature (Berry, et al., 1989; McDougall, 2004; Suen et al., 2004). Berry and colleagues (1989) have argued that memory self-efficacy is related more highly to memory tasks that are used in daily life. The performance test used in this study was designed to compensate for the deficits in traditional laboratory tests, such as recalling a string of digits or paired associates which may not be realistic or practical in examining people' memory for everyday life. Memory self-efficacy appeared to be a significant predictor in the present study. Likewise, memory self-efficacy was the only predictor with a significant effect on Taiwanese older immigrants' memory as compared to the other three predictors - sleep, depression, and physical activity (Suen et al., 2004).

Age and memory performance. The older a person is, the less likely he or she will be to do well on memory tasks. This finding has been supported by several studies (Elias, Elias, D'Agostino, Silbershatz, & Wolf, 1997; Jonker, et al., 1997; Herzog & Rodgers, 1989; West, Welch, &Knabb, 2002). Age was also inversely related to male older adults' memory function (McDougall, 2004). Likewise, Suen and colleagues (2004) asserted that age had a large effect on Taiwanese American older adults' memory performance. Age was a significant predictor for memory performance in this study, and this has been substantially supported in literature (Jonker, et al., 1997; McDougall, 2004; Suen at al., 2004).

Education and memory performance. The relationship between the older adults' education and their memory performance has been researched extensively. In general, the higher level of education the older adult had, the better was his/her memory performance

(Elias, et al, 1997; Jonker, et al., 1997; McDougall, 2004). A similar finding was shown, i.e., the education level of Asian elderly immigrants was significantly related to their performance (Suen, 2000). Indeed, education appears to be an important factor in studying memory performance. The relationship between education and memory performance has also been found across age groups, indicating that memory performance improved as the level of education increased (Herzog & Rodgers, 1989).

Education attainment as documented in this study, was a significant predictor for everyday memory performance. Likewise, Herzog and Rodgers (1989) reported that education was a significant predictor for a recall test. However, education did not appear to be a significant predictor for Taiwanese older immigrants' performance, despite a strong correlation between education and performance ($p < .001$) that otherwise existed (Suen et al, 2004). Education did not predict memory performance in a group of 172 elderly men (McDougall, 2004). Some of these reports may suggest that maintaining a cognitively stimulating lifestyle in older age would be helpful in preserving memory function.

Health and memory performance. The perceived health status in this study was positively related to memory performance, suggesting that the better health perception a participant has, the more likely he/she is to perform better on memory tests. This finding was also consistent with Herzog and Rodgers's (1989) study. According to these findings, older adults are encouraged to observe their health closely in order to preserve memory function, and consequently, to ensure an independent style of living.

In sum, factors including age, education, health, metamemory and memory self-efficacy were significantly related to memory performance in Taiwanese older adults.

Although factors such as age, education and health cannot be changed, older adults should be encouraged to engage in activities which promote health and stimulate cognition, in order to enhance memory function. In addition, subjective evaluation of memory, including metamemory and memory self-efficacy, are noteworthy in understanding memory function in older adults.

Methodological Issues for Future Studies

Issues related to methodology in the current study deserve considerations. The following section discusses recruitment strategy, sample and instruments.

Recruitment strategy. Face-to-face interviews as a method for data collection were conducted in this study. In general, older adults showed willingness to help the investigator complete the interview. The investigator initially introduced herself in the beginning of classes taught in the senior center and placed a sign-up sheet for individuals to express their interest. In one center, several participants spontaneously took part in the study. However, this approach did not work as well at the other center. At the second center, the investigator approached potential participants and offered her business card to convey her affiliation and to ask if they were interested in learning their memory function. This type of interpersonal contact worked better within this center. In particular, the investigator had stayed in the center for a month and, thus, had the opportunity to be known to the residents. Once the trust-building relationship between the investigator and the target population had been established, the target older adults became approachable and acceptable for the interview process to commence.

Culture-specific factors, such as networking and companionship in promoting older adults' health, deserve attention (Chen, 2003). The method of snowball sampling or

personal referral should be taken into account in recruiting Taiwanese older adults as research participants in the future. Being a part of a conservative culture, some older Taiwanese adults may not be willing to accept an interview with a stranger. Therefore, referral as a means for data collection would be helpful toward a successful research recruitment, because early sample participants are invited to refer others who meet the eligibility criteria (Brink & Wood, 2004). Within this networking, the potential study participants would be more agreeable and confident about undertaking an interview.

An alternative strategy used in data collection is through the way in which a question is composed when approaching the study participants. Initially, the investigator invited the potential older adults to participate in a memory survey. Older adults did not respond well to this type of question. Instead, the invitation was reworded to ask the adults to indicate their interest in knowing the quality of their memory. This phrasing worked better than the previous one and resulted in an enhanced recruitment process. People seemed to be more interested in learning their memory status and in having their actual performance tested rather than in merely answering the survey questions. Although monetary incentives are often used in research, the prospect of knowing one's own health condition (e.g., memory quality in this study) may act as a stronger incentive for participating in a research study (Taylor-Piliae & Froelicher, 2007).

Sample. Participants in the current study were considered to be a fairly well educated group, although the average education attainment was 10.69 years. According to the national data in Taiwan, 51.67% of older adults aged 65 years and above have completed elementary education, followed by those who described as illiterate (18.24%) and ones who completed junior high school (9.57%) (Ministry of the Interior in Taiwan,

2008). One factor which contributed to this sample selection was the locations of recruitment sites, which were all in a metropolitan area. Although these sites offered both educational and entertainment programs for older adults, people with higher education tended to enroll in educational programs, including language studies or computer learning. These same people also showed a greater tendency to participate in a research project. The need to recruit Taiwanese older adults with a wider range of education attainment is essential for future study. Moreover, the resulting sample participants would be described as younger older adults, with 47.7% of them in a range from 65 - 70 years old. Taking all these factors into account, the generalization of the findings should be interpreted with caution.

Instruments

Three instruments used in this study need refinement for future use with Taiwanese older adults. The following section will discuss measurement issues with older adults as well as each of the three instruments.

Measurement Issues with Older Adults. Many researchers do not take the distinctive characteristics of the geriatric population into consideration, because studies generally tend to group all adults together (Raison, 2004). The purpose of examining the validity of the instrument is not to validate the instrument per se, but to validate an instrument with respect to a specific group (Burnside, Preski, & Hertz, 1998; Raison, 2004). Some cautions must be taken before administering an instrument to older adults in order to minimize both random and systemic measurement error, and hence achieve reliability and validity. Potential sources of error within the elder population include

anxiety in testing situations, age-related changes in vision and hearing, fatigue, and chronic illnesses (Burnside et al., 1998).

Furthermore, characteristics of an instrument can possibly threaten validity. These include improper item content, lack of word clarity, low readability of items, and item format such as Visual Analog Scales (VAS) (Raison, 2004). With respect to the instrument administration, researchers must be aware of the participants' literacy level and measurement burden. Measurement burden is a concern, especially for elder participants. The completion of multiple instruments and the demands of measurement protocols can exhaust these subjects and lead to results which are less valid and less reliable (Strickland, 1996). All these issues also apply to Taiwanese older adults.

Metamemory

The instrument used to measure older adults' memory knowledge, perception and attitudes toward their memory is Metamemory in Adulthood (MIA). The MIA has been demonstrated as a comprehensive and well-validated instrument; however, the length of the MIA is beyond the initial expectation of most participants. The participants could be exhausted by doing a long interview and give the biased responses which may threaten the measurement of validity and reliability (Strickland, 1996). Moreover, one strength of the MIA is to ask similar questions of the participant in different ways, to validate the responses. However, some participants may take this as a repetition of questions and may lose patience in providing their answers. Although several Taiwanese older adults in this study did notice the similarity of the questions, they all completed the interview. Indeed, a lengthy interview may impact on the feedback of the respondents.

Although there are seven subscales in the MIA, each subscale can be tested individually, depending upon the focus of the study. The investigator decided to use all subscales in the current research due to the fact that this was the first time the MIA had been conducted with Taiwanese older adults. Their valuable inputs in the MIA would help the investigator understand the characteristics of metamemory in Taiwanese older adults. Consequently, any changes in the MIA would be considered, if needed, based on the older adults' responses.

To make the MIA more parsimonious for research use, researchers have either revised or shortened the instrument (Ponds & Jolly, 1996; McDougall, Becker, Arheart, 2006). Ponds and Jolly (1996) reduced the total from 108 items in seven subscales to 74 items with the same subscales, based on the factor analysis with 1,899 participants. McDougall and colleagues (2006) utilized items from selected MIA subscales to compose a new instrument, namely memory complaints, with 690 older adults. These advances in the measurement of the MIA show a promising direction in understanding older adults' metamemory.

Memory self-efficacy

Older adults' memory self-efficacy was measured with the four-item Memory Efficacy (ME). Some findings concerning memory self-efficacy in the current study were especially noteworthy. The confidence rating was changed from 0 – 100% to 0 – 10 with a description of 0 meaning no confidence, and 10 equaling 100% confidence with the memory tasks. The 0 – 10 rating scale seemed less intimidating to the participants, compared to the rating of 0 – 100% used in the pilot study. A large-print paper describing

the four items and the ratings was provided to assist the respondents in circling the best answer. The respondents seemed to have less difficulty in choosing the answers this time.

However, the magic number 5 may raise cautions in this type of instrument. On the point 5 in the scale, there was a statement describing as moderate confidence, which assisted the respondent in understanding the measurement of the scale. However, this may have contributed to a biased response, because the participants tended to choose the middle point as their answer. In this study, the frequency of the 5 point response for the first three items represented the largest portion within each item; they were 23.8%, 33.1% and 35.4%, respectively. This could possibly be due to the respondents' social desirability during the interview. Presumably, the respondents did not want to show they had less strength in memory ability than others. Another possible explanation is due to a culture-specific factor. Under the teachings of Confucianism, modesty and humbleness in life have been emphasized (Chen, 2001). Asians tend to be more conservative and endorse milder or subtler forms of expression than those characteristic of Westerners (Chen, 1996; Mau, 2000). These cultural influences may result in the choice of the middle point in a given scale. Thus, researchers need to be more cautious in interpreting the results from Asian studies and ensure that any conclusions take into account the nuances of the subject culture.

Memory performance

Taiwanese older adults' memory performance was measured with the Rivermead Behaviour Memory Test (RBMT) that aims to test individuals' everyday memory. Some possible remedies of this instrument for future use are described. First, face recognition seemed to posit a problem in this study. The participants were asked to identify pictures

of faces displayed previously in groups that also included distracters. Although an Asian-like face was substituted in this version of the RBMT, the rest of faces were taken from westerners including Caucasian and African Americans. Some older adults reported difficulty in identifying these faces during the interview. The cross-race effect, own–race advantage in literature has been conveyed by expressions such "all Asians look alike" or "all westerners look like" (Hayward, Rhodes, & Schwaninger, 2008; Walker & Hewstone, 2006). This effect may have made the test harder for Taiwanese older adults to differentiate between people of other races. In Suen's (2000) study, she used five Asian faces and five Caucasian faces in questioning Taiwanese elderly immigrants and found a significant difference ($p < .001$), indicating these older adults displayed a better recognition with Asian faces than Caucasian faces. She further suggested that using all Asian faces would have improved the participants' memory scores.

In another section that was testing the name of a person, although that name had been changed to a Taiwanese name, the photo of a westerner stayed the same. It was not clear that if this discrepancy between the photo and the name caused the lower score in this part of performance. However, the Hong Kong Chinese version of the RBMT replaced the photo with a Chinese person (Ng, et al., 1996). All these factors should be taken into account for future use.

Implications and Recommendations

The results of this present study provide implications and recommendations for future nursing research, education, and clinical practice.

Nursing research

Some possible research topics derived from this study are the meaning of memory, collaborative memory and the intervention study for Taiwanese older adults.

The meaning of memory. To further understand Taiwanese older adults' memory, an in-depth interview based on a qualitative method may be applied. Bandura's self-efficacy plays a powerful factor in understanding individuals' performance. Self-efficacy has been defined as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1997, p.3). Several factors could have influenced the level of memory self-efficacy in older adults (Bandura, 1997). These factors have included age stereotype, physical impairment, psychological distress and major life changes. Bandura claimed that people who perceived their memory could be improved were likely to exert efforts toward memory enhancement. On the other hand, those who viewed memory as inevitably declining with age were unlikely to work on their own memory, which can have resulted in a lowered memory self-efficacy (Bandura, 1997).

Arguably, older adults exercising less effort into their memory function do not necessarily reflect that their perceived self-efficacy is low. When they realize the effects of physiological and cognitive aging, many older adults may lower their levels of expectation and also make positive adjustments in their life situations. A model of selective optimization with compensation (SOC) has been developed to explain that older adults may adapt their losses through selection (involving fewer domains of functioning), compensation (adapting to the loss by other means), and optimization (accepting one's current condition) (Baltes & Baltes, 1990; Ouwehand, de Ridder, & Bensing, 2007).

The meaning of memory in Taiwanese older adults is of interest, because it may depict a different philosophy from that in western elders, who strive for an independent status and who resist as long as possible any dependency on their children (Luborsky & McMullen, 1999). On the other hand, the positive values associated with old age in Chinese culture differ significantly from the values attributed to the elderly in American culture. Two examples of this construct are the qualities of reciprocity and dependency, which are highly valued in Chinese cultures (Luborsky & McMullen, 1999). Although aging Americans and Chinese both seek to remain healthy and independent as long as possible, Chinese elders may accept the approach of old age more willingly because Chinese culture allows for the elderly to assume a dependent role in their family, once their health level decreases (Luborsky & McMullen, 1999). It is also a resulting assumption that cultural differences lead the elderly Chinese toward an easier adaptation to major loss of their own memory.

Collaborative memory. Research literature has suggested that a better memory performance can be achieved by working as a group, as a married couple, or even as a pair of strangers, compared to the memory performance of individuals (Dixon & Gould, 1996, 1998). Working as a pair could compensate for each individual. For example, elderly spouses give each other memory cues by relating personal references to a story recall test. Such collaborative or interactive context enfolds memory performance into daily activities. Examples are a student study group preparing for the examination, family groups reconstructing their past stories, spouses helping each other remember important dates or appointments, and strangers consulting to find directions in an unfamiliar city (Dixon, 1999). This theory of collaboration is significant in memory and aging, because

the elderly learn to develop strategies or ways of using other individuals as human cognitive aids to compensate for their aging-related deficit (Dixon, 1999).

It is a given fact that Taiwanese older adults usually live with their children because of the fundamental value of filial piety in Chinese culture. This living arrangement may buffer the negative aspects of aging and may help to compensate for age-related memory loss (Luborsky & McMullen, 1999). Therefore, it is important in understanding collaborative memory within this culture to expand the knowledge of memory and aging. Furthermore, Dixon (1999) suggested a need for further exploration of collaborative memory in cultures emphasizing the group rather than the individual. This additional study may document a cognitive performance with strong results at the group level. In addition, the pair as parent and child, other than the pair as spouses, deserves further exploration in the context of collaborative memory in Taiwan.

Memory intervention study. Researchers have studied the effect of memory training in improving or sustaining the memory function in older adults. This study showed that memory self-efficacy contributed to variance in memory performance. Thus, introducing an interventional research aiming to increase older adults' memory self-efficacy would help them improve or sustain their memory function. A variety of memory intervention techniques have been developed and tested; most of these have focused on teaching or practicing mnemonic strategies to improve episodic memory (Ball et al., 2002; Floyd & Scogin, 1997). Cognitive aging research indicated that older adults were interested in learning memory improvement techniques, but often were unaware of how they could acquire these skills and implement them in their daily routines (McDougall, 1994). Typical individual learning from classroom memory strategies may

not be sufficient by itself, in engaging or transferring these strategies into older adults' daily lives. Learning as a group provides positive effects acquired through mutual support, and it is helpful to the success in memory intervention programs, especially with additional components -- visual imagery, relaxation, motivation enhancement, and reinforcement of memory strategies (McDougall, 1999).

Furthermore, individualized implementation of memory strategies has been shown to improve medication adherence in older adults (Insel & Cole, 2005). Older adults are likely to develop chronic illness as they age. Medication adherence becomes a problem due to the changes in cognitive function that occur with normal aging (Insel et al., 2006). Thus, investigators have designed interventions to assist older adults in remembering to take medication and in monitoring if the medication was taken as intended. These interventions were designed from individual strategies suggested by the participant to the investigators (Insel & Cole, 2005). This line of research has demonstrated a promising effect of memory intervention in resolving the clinical problems in the older adult population. Likewise, memory strategies can be applied to other health-related conditions, including the need for a patient to take blood pressure or blood sugar measurements and utilize them in his/her daily regimen.

Nursing education

The importance of older adult health as a topic in nursing education should be emphasized. Aging within society is a global issue, and that has been widely discussed. As a result, older adults are likely to be the majority of patients who receive care from nurses. Nursing educators have been aware of the increasing need to care for older adults in healthcare settings and have made efforts to help future nurses be equipped with

adequate geriatric knowledge and clinical skills (Scholder, Kagan, & Schumann, 2004). Although the literature has demonstrated that nursing students or nurses tend to have a negative attitude toward older adults, educational strategies have been developed to resolve this negativity (Williams, Anderson, & Day, 2007; Sheffler, 1998). Using the power of a website to reinforce the positive image of older adults and to attract potential students to gerontology as a nursing specialty has also been suggested (Escober et al., 2007). However, only 34% of the current BSN programs offer a required gerontological nursing course in the U.S., and 29% of all programs lack faculty members credentialed in geriatrics (Berman, et al., 2005). Both of these statistical realities may impact the development of gerontology nursing. Similarly, the need to infuse the content of gerontological nursing into advanced nursing programs is critical, because advanced practice nurses will inevitably care for older adults in their practice, in home health care or ambulatory appointments (Kohlenberg, Kennedy-Malone, Crane, & Letvak, 2007). The need for raising the awareness of gerontological nursing is essential in order to meet the challenge encountered by a rapidly growing older adult population. This scenario is the same in Taiwan.

In spite of the current obstacles, efforts have been made to attract nursing students or nurses into the specificity of gerontological nursing. Further, the subjects of the content of aging and memory should be incorporated into the gerontological content in order to enhance the holistic care of older adults. There must be an emphasis on the importance of understanding memory process and the capability to differentiate between the normal and pathological memory process, rather than holding a stereotype of aging memory. On the other hand, introducing the concept of subjective memory, namely

metamemory and memory self-efficacy, is important in terms of health education. Given the time limitation on many older adults' healthcare visits, the health information given by nurses could be delivered effectively by understanding older adults' memory capacity and strategy. An exemplary case would be in home healthcare in which nurses not only assess the client's health condition but also follow up on their client's performance of daily activities to ensure their eligibility for independent living. It follows that memory function is the key to sustaining an independent lifestyle. Nurses with accurate knowledge concerning memory function in the older adult population are then likely to make a sound judgment in determining the client's health condition, rather than making judgments based on aging stereotypes.

Nursing practice

Older adults often report subjective memory loss. Nurses who have direct contact with older adult patients are in the position to notice older adults' memory declines. Although the relationship between the subjective memory complaint and objective memory performance has remained inconclusive in literature (Hertzog & Hultsch, 2000; Schmidt, Berg, & Deelman, 2001), nurses should be aware of older adults' memory complaints in their practice. These complaints should be taken into account, since they may reflect some disorders involving affect-related problems such as anxiety or depression. Therefore, nurses working with older adults should listen to what the clients say, and further assessments or referrals may be required to find the cause of memory impairment.

Self-report of memory function in older adults can be useful in identifying their concerns about their own memory function. However, some older adults may be at risk

from not being able to make an evaluation of their memory functioning level. Consequently, nurses must be aware of such detriments in cognitive self-monitoring, which can lead to further declines in cognitive functioning, reduced everyday functions, and a lower quality of life (Miller, 1998). Nurses caring for older adults in any setting are encouraged to improve their self-awareness of memory and aging research. They should also be skilled in making a simple assessment of memory function, in identifying early subtle changes in memory, so that proper care may be arranged in a timely manner.

In this study, only half of elderly Taiwanese demonstrated prospective memory, which is remembering to undertake future tasks. Therefore, nurses can work with older clients to identify or develop memory strategies that assist them in managing their daily regimen of medication or in maintaining their doctor's appointments that require prospective memory. For example, an individual may use a mental strategy such as to repeat something silently that he/she is trying to remember. Others may be inclined to adopt memory aids such as notes or calendars to help them remember appointments. If nurses could provide appropriate memory strategies, their older adult clients who may be more likely to sustain their health-related activities, and resulting in a better long-term health status.

Summary

Although there is paucity in prior research of the relationship between memory and aging in Taiwan, this current study makes an attempt to bridge the gap. Results of this study suggest that age, education, health and subjective memory evaluation, including metamemory and memory self-efficacy, contribute to memory performance in Taiwanese older adults. Although factors which influence memory, such as age and

education, cannot be changed, initiating a cognitively stimulating and healthful lifestyle may preserve the successful memory function of older adults. In addition, the relationship between subjective memory and objective memory is supported by indications that older adults who possess greater motivation to perform well in memory-demanding tasks, have greater memory capacity and tend to perform well on memory tasks. Likewise, these older adults use memory strategy to a greater extent, have better knowledge of memory processes, have higher confidence in their own memory and, consequently, are apt to demonstrate better memory performance. Interventional programs concerning the above-mentioned factors may provide Taiwanese older adults with an enhancement of their knowledge, perceptions and beliefs about their own memory. Furthermore, having their memory evaluated objectively could also provide older adults with productive insight into their quality of memory. Culture-specific factors, which existed in this study, need to be redefined for future research, in order to capture a more accurate picture of memory in Taiwanese older adults.

Appendices

Appendix A

Letters of Authorization for Recruitment

Shengpin Senior Citizen Activity Center

51 Shengpin St., West District,
Taichung City 40358, Taiwan (ROC)
(011) 886-4-23023956

August 3, 2007

To whom it may concern:

I understand that Ms. Wen-Miao Liu, MSN, a doctoral student at The University of Texas at Austin School of Nursing, wishes to conduct a dissertational study of memory knowledge and attitudes in Taiwanese older adults between November 2007 and February 2008. This research is unique, and I am pleased that Ms. Liu will systematically investigate the knowledge and attitudes older Taiwanese adults have toward their memory, a subject less understood in Taiwan than in Western countries. I hereby authorize her to conduct research activities at this facility. Please do not hesitate to contact me if I can be of any assistance.

Sincerely,

You Chen

You Chen

Director, Shengpin Senior Citizen Activity Center

Gain-Lin Social Welfare Foundation

No. 29-1, Dacyuan St., West District,
Taichung City 40343, Taiwan (ROC)
(011) 886-4-23761221

August 6, 2007

To whom it may concern,

I understand that Ms. Wen-Miao Liu, MSN, a doctoral student at The University of Texas at Austin School of Nursing, wishes to conduct a dissertational study of memory knowledge and attitudes in Taiwanese older adults between November 2007 and February 2008. This research is unique, and I am pleased that Ms. Liu will systematically investigate the knowledge and attitudes older Taiwanese adults have toward their memory, a subject less understood in Taiwan than in Western countries. I hereby authorize her to conduct research activities at this facility. Please do not hesitate to contact me if I can be of any assistance.

Sincerely,

Li-No Chen

Chief Executive Officer

Ganlin Social Welfare and Charity Foundation

* In Taiwan, continuing education programs for senior citizens are customarily called 'evergreen universities.' Such programs are organized by non-profit organizations and conducted in centers, not necessarily on university campuses."

Datong Village Senior Citizen Center

NO. 37, Dadun 6th St., Nantun District,
Taichung City 40864, Taiwan (R.O.C.)
(011) 886-4-24723432

August 7, 2007

To whom it may concern:

I understand that Ms. Wen-Miao Liu, MSN, a doctoral student at The University of Texas at Austin School of Nursing, wishes to conduct a dissertational study of memory knowledge and attitudes in Taiwanese older adults between November 2007 and February 2008. This research is unique, and I am pleased that Ms. Liu will systematically investigate the knowledge and attitudes older Taiwanese adults have toward their memory, a subject less understood in Taiwan than in Western countries. I hereby authorize her to conduct research activities at this facility. Please do not hesitate to contact me if I can be of any assistance.

Sincerely,

Yue-Jhu You Yue-Jhu You

Village head, Datong Village Senior Citizen Center

Appendix B

Cover Letter

Cover Letter

Memory knowledge and beliefs among Taiwanese older adults

Conducted By: Wen-Miao Liu, MSN, RN IRB PROTOCOL # 2007-04-0061
The University of Texas at Austin, School of Nursing, Telephone: (512) 2933484, (04) 24714745

Faculty Sponsor: Graham, J. McDougall, School of Nursing, PhD, APRN, FAAN, (512) 4717936

You are being asked to participate in a research study. This form provides you with information about the study. The person in charge of this research will also describe this study to you and answer all of your questions. Please read the information below and ask any questions you might have before deciding whether or not to take part. Your participation is entirely voluntary. You can refuse to participate without penalty or loss of benefits to which you are otherwise entitled. You can stop your participation at any time and your refusal will not impact current or future relationships with UT Austin or participating sites. To do so simply tell the researcher you wish to stop participation. The researcher will provide you with a copy of this consent for your records.

The purpose of this study is to understand memory knowledge and beliefs among Taiwanese older adults

If you agree to be in this study, we will ask you to do the following things:

- The study will be explained to you and you will be asked a few beginning questions about your age, availability and health.
- Your will be asked to complete a series of questions about your memory, in writing or in an interview.
- You may answer the questions at the center or another site.
- If you cannot complete the interview, I will set another time to finish the interview with you.

Total estimated time to participate in this study is 1 and a half hours at each interview.

Risks and Benefits of being in the study

- There are no known risks; however, you may experience some anxiety or discomfort as your level of memory performance is tested
- There are no direct benefits to the participants; however, you may gain memory knowledge or awareness about your memory through this study.

Compensation:

- You will receive 6 dollars for participating.

Confidentiality and Privacy Protections:

- All interviews will be conducted in a private room at the center or another site. Your information is linked to variables on the database through numeric ID codes. No personal identifying information is available in the database. All identifiable information will be destroyed at the end of the study.

- The data resulting from your participation may be made available to other researchers in the future for research purposes not detailed within this consent form. In these cases, the data will contain no identifying information that could associate you with it, or with your participation in any study.

The records of this study will be stored securely and kept confidential. Authorized persons from The University of Texas at Austin and members of the Institutional Review Board have the legal right to review your research records and will protect the confidentiality of those records to the extent permitted by law. All publications will exclude any information that will make it possible to identify you as a subject. Throughout the study, the researchers will notify you of new information that may become available and that might affect your decision to remain in the study.

Contacts and Questions:

If you have any questions about the study please ask now. If you have questions later, want additional information, or wish to withdraw your participation call the researchers conducting the study. Their names, phone numbers, and e-mail addresses are at the top of the first page. If you have questions about your rights as a research participant, complaints, concerns, or questions about the research please contact Jody Jensen, Ph.D., Chair, The University of Texas at Austin Institutional Review Board for the Protection of Human Subjects at (512) 232-2685 or the Office of Research Support and Compliance at (512) 471-8871 or email: orsc@uts.cc.utexas.edu.

You will be given a copy of this information to keep for your records.

同 意 書

人權審查委員會編號#2007-04-0061

題目: 台灣老人的記憶知識及信念

研究者: 劉紋妙，美國德州大學奧斯汀分校護理系博士班學生，(04) 24714745
指導教授: 葛南・麥道格，美國德州大學奧斯汀分校護理系教授，(512) 4717936

您被邀請參與此次研究，這封信是提供您有關這個研究的相關訊息。研究者會跟您講述研究內容並回答您的問題。在您決定是否參加這個研究前，請詳讀以下內容並提問問題。您的參與是完全自發性的，您的權益並不會因拒絕參加這個研究而受損。您可以在任何時間停止參加此研究，而且您的拒絕不會影響您與德州大學或老人活動中心的任何關係，如果您想要停止參加只需告訴研究者。研究者會提供一份同意書給您作爲紀錄。

這個研究的目的是在瞭解台灣老人的記憶知識及信念，如果您同意參加，我們會請您做以下的事: (1)我會先跟您介紹此研究的內容並在開始時詢問一些背景資料如年齡及健康等等 (2)我會請問您一系列有關記憶的問題，您可以選擇自填問卷或由我訪問 (3)您可以選擇在老人活動中心或其它地點進行訪談 (4)假如您無法一次完成訪問，我們可以另擇時間完成訪談。訪談時間大約一次一個半小時。此研究對您並無直接的危險性，但是在進行記憶測試時可能會有一些焦慮或不舒服。此外，也無直接性的利益，但是您可以從訪談中獲得一些關於記憶方面的知識並增加自己的警覺性。我們會提供兩百元酬謝您的參與。

所有的訪談皆會在活動中心的一間隱密性房間進行。您提供的資料將會用數字代表存放在資料庫中，不會顯示任何私人性的資料。若是這份資料在將來被用在不同的研究主題時，不會顯示任何您的個人資料。這個研究的資料會被放置在安全、隱密的地方，只有德州大學奧斯汀分校授權的人員、人權審查委員會的委員和指導教授可以合法的查看研究資料，法律也會確保資料的隱密性。從這個研究發表的文章，將不會有任何關於您個人的資料。在整個研究過程中，研究者會通知您有關此研究新的資料，而這些資料也許會影響您繼續參與此研究的決定。

如果您現在有任何關於此研究的問題，請您發問。若是後來您有問題、希望獲得額外的資訊或想要停止參加此研究，請告知研究者，他們的姓名及電話在第一頁的上方。若是您有關於作爲一個研究對象的人權、抱怨、擔心或問題，請聯絡裘蒂・傑森博士，他是德州大學奧斯汀分校人權審查委員會的主任委員，他的電話是 (512) 232-2685或是研究協助及遵從的辦公室 (512) 471-8871 或是電子郵件 orsc@uts.cc.utexas.edu.

此份同意書將提供給您做爲紀錄

Appendix C

Questionnaires

Shot Portable Mental Status Questionnaire (SPMSQ)

Ask question 4A only if patient does not have a telephone. Record total number of errors based on ten questions.

1. What is the day today? _____
Month Day Year

2. What day of the week is it? _____

3. What is the name of this place?_____

4. What is your telephone number? _____

4A. What is your street address? _____

(ask only if patients does not have a telephone)

5. How old are you? _____

6. When were you born? _____

7. Who is the President of Taiwan now? _____

8. Who was the Presidents just before now? _____

9. What was your mother's maiden name? _____

10. 20-3-3-3-3-3-3-3 =

_____ Total Number of Errors

Demographic Data

I.D._____

1. Gender: Female_____ Male_____

2. Age: _____ years

3. Marital status:
   Married_____ Single_____Widowed_____Separated_____
   Divorce___ Live together_____Other_____

4. Living arrangement: Self _____ Spouse_____ Children_____
   Spouse and Children___

5. Education: Elementary School_____Junior High_____High School_____
   College_____ Master's Degree_____ Ph.D_____
   Total years of education:_____ year

6. Do you have any chronic illnesses?(diagnosed by healthcare professionals)
   No_____ Yes_____,
   Hypertension _____ Heart Disease_____Diabetes_____
   Lung (asthma/chronic bronchitis) _____Stroke _____
   Gastric Ulcer _____ Sensory _____Cancer _____
   Arthritis _____ Emotional/Mental _____ Other _____

Self-Rated Health Status

1. How would you rate your health at the present time?

   Excellent____ Good_____ Fair_____
   Poor_____

2. Is your health now better, about the same, or not as good as it was three years ago?

   Better____ Same____ Not as good____

3. Do your health problems stand in the way of your doing the things you want to do?

   Not at all____ A little ____ A great deal____

4. Would you say that your health is better, about the same, or not as good as most people your age?

   Better____ Same____ Not as good____

Memory Efficacy (ME)

1. "I know how to keep my memory from going downhill as I age."

No Yes

1 2 3 4 5 6 7 8 9 10

Little Moderate 100%

2. "I can discover ways either by myself or with the help of others to maintain my memory.

No Yes

1 2 3 4 5 6 7 8 9 10

Little Moderate 100%

3. "If I knew ways to keep my memory up, I would make an effort to use them."

No Yes

1 2 3 4 5 6 7 8 9 10

Little Moderate 100%

4. "If necessary, I would be able to get someone to remember things for me as I get older."

No Yes

1 2 3 4 5 6 7 8 9 10

Little Moderate 100%

Memory evaluation:

1. How good is your memory now?

1. very poor 2. poor 3. fair 4. average 5. good 6. very good 7. excellent

Metamemory in Adulthood (MIA)

1.	For most people, facts that are interesting are easier to remember than facts that are not.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
2.	I am good at remembering names.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
3.	Do you keep a list or otherwise note important dates, such as birthdays and anniversaries?	1 a. 2 b. 3 c. 4 d. 5 e.	never rarely sometimes often always
4.	It is important to me to have a good memory.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
5.	I get upset when I cannot remember something	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
6.	When you are looking for something you have recently misplaced, do you try to retrace your steps in order to locate it?	1 a. 2 b. 3 c. 4 d. 5 e.	never rarely sometimes often always
7.	I think a good memory is something of which to be proud.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly

8.	I find it harder to remember things when I am upset.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
9.	I am good at remembering birthdates.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
10.	I can remember things as well as always.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
11.	When you have not finished reading a book or magazine do you somehow note the place where you have stopped?	1 a. 2 b. 3 c. 4 d. 5 e.	never rarely sometimes often always
12.	I get anxious when I am asked to remember something.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
13.	It bothers me when others notice my memory failures.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
14.	I'm less efficient at remembering things now than I used to be.	1 a. 2 b. 3 c. 4 d. 5 e.	agree strongly agree undecided disagree disagree strongly
15.	I have difficulty remembering things when I am anxious.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly

16.	The older I get the harder it is to remember clearly.	1 a. 2 b. 3 c. 4 d. 5 e.	agree strongly agree undecided disagree disagree strongly
17.	Do you think about the day's activities at the beginning of the day so you can remember what you are supposed to do?	1 a. 2 b. 3 c. 4 d. 5 e.	never rarely sometimes often always
18.	I am just as good at remembering as I ever was.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
19.	I have no trouble keeping track of my appointments.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
20.	For most people, it is easier to remember information they need to use immediately than information they will not use for a long time.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
21.	Most people find it easier to remember directions to places they want or need to go than to places they know they will never be going.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
22.	I am usually uneasy when I attempt a problem that requires me to use my memory.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
23.	I feel jittery if I have to introduce someone I just met.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly

24.	Having a better memory would be nice but it is not very important.	1 a. 2 b. 3 c. 4 d. 5 e.	agree strongly agree undecided disagree disagree strongly
25.	Do you post reminders of things you need to do in a prominent place, such as on bulletin boards or note boards?	1 a. 2 b. 3 c. 4 d. 5 e.	never rarely sometimes often always
26.	It doesn't bother me when my memory fails.	1 a. 2 b. 3 c. 4 d. 5 e.	agree strongly agree undecided disagree disagree strongly
27.	I am poor at remembering trivia.	1 a. 2 b. 3 c. 4 d. 5 e.	agree strongly agree undecided disagree disagree strongly
28.	I am much worse now at remembering the content of news articles and broadcasts than I was 10 years ago.	1 a. 2 b. 3 c. 4 d. 5 e.	agree strongly agree undecided disagree disagree strongly
29.	Do you routinely keep things in a familiar spot so you won't forget them when you need to locate them?	1 a. 2 b. 3 c. 4 d. 5 e.	never rarely sometimes often always
30.	Compared to 10 years ago, I am much worse at remembering titles of books, films or plays.	1 a. 2 b. 3 c. 4 d. 5 e.	agree strongly agree undecided disagree disagree strongly
31.	For most people it is easier to remember words they want to use than words they know they will never use.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly

32.	I remember my dreams much less now than 10 years ago.	1 a. 2 b. 3 c. 4 d. 5 e.	agree strongly agree undecided disagree disagree strongly
33.	I can't expect to be good at remembering zip codes at my age.	1 a. 2 b. 3 c. 4 d. 5 e.	agree strongly agree undecided disagree disagree strongly
34.	Most people find it easier to remember the names of people they especially dislike than people they hardly notice.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
35.	I have little control over my memory ability.	1 a. 2 b. 3 c. 4 d. 5 e.	agree strongly agree undecided disagree disagree strongly
36.	When you want to take something with you, do you leave it in an obvious, prominent place, such as putting your suitcase in front of the door?	1 a. 2 b. 3 c. 4 d. 5 e.	never rarely sometimes often always
37.	I think it is important to work at sustaining my memory abilities.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
38.	I misplace things more frequently now than when I was younger.	1 a. 2 b. 3 c. 4 d. 5 e.	agree strongly agree undecided disagree disagree strongly
39.	As people get older they tend to forget where they put things more frequently.	1 a. 2 b. 3 c. 4 d. 5 e.	agree strongly agree undecided disagree disagree strongly

40.	I work hard at trying to improve my memory.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
41.	Compared to 10 years ago, I now forget many more appointments.	1 a. 2 b. 3 c. 4 d. 5 e.	agree strongly agree undecided disagree disagree strongly
42.	If I am put on the spot to remember names, I know I will have difficulty doing it.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
43.	For most people, it is easier to remember the names of people they especially like than people that don't make much of an impression on them.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
44.	Most people find it easier to remember words they understand than words that don't mean very much to them.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
45.	My memory for important events has improved over the last 10 years.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
46.	I admire people who have good memories.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
47.	My friends often notice my memory ability.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly

48.	When you try to remember people you have met, do you associate names and faces?	1 a. 2 b. 3 c. 4 d. 5 e.	never rarely sometimes often always
49.	I am good at remembering the order that events occurred.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
50.	For most people, words they have seen or heard before are easier to remember than words that are totally new to them.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
51.	Familiar things are easier to remember than unfamiliar things.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
52.	I am good at remembering conversations I have had.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
53.	I would feel on edge right now if I had to take a memory test or something similar.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
54.	My memory for phone numbers will decline as I get older.	1 a. 2 b. 3 c. 4 d. 5 e.	agree strongly agree undecided disagree disagree strongly
55.	I often notice my friends' memory ability.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly

56.	My memory for dates has greatly declined in the last 10 years	1 a. 2 b. 3 c. 4 d. 5 e.	agree strongly agree undecided disagree disagree strongly
57.	When you have trouble remembering something do you try to remember something similar in order to help you remember.	1 a. 2 b. 3 c. 4 d. 5 e.	never rarely sometimes often always
58.	My memory for names has declined greatly in the last 10 years.	1 a. 2 b. 3 c. 4 d. 5 e.	agree strongly agree undecided disagree disagree strongly
59.	I often forget who was with me at events I have attended.	1 a. 2 b. 3 c. 4 d. 5 e.	agree strongly agree undecided disagree disagree strongly
60.	Do you consciously attempt to reconstruct the day's events in order to remember something?	1 a. 2 b. 3 c. 4 d. 5 e.	never rarely sometimes often always
61.	As long as I exercise my memory it will not decline.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
62.	I am good at remembering the places I have been.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
63.	I know if I keep using my memory I will never lose it.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly

64.	Do you try to relate something you want to remember to something else hoping that this will increase the likelihood of your remembering later?	1 a. 2 b. 3 c. 4 d. 5 e.	never rarely sometimes often always
65.	It's important that I am very accurate when remembering names of people.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
66.	When I am tense and uneasy at a social gathering, I cannot remember names very well.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
67.	Do you try to concentrate hard on something you want to remember?	1 a. 2 b. 3 c. 4 d. 5 e.	never rarely sometimes often always
68.	It's important that I am very accurate when remembering significant dates.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
69.	It's up to me to keep my remembering abilities from deteriorating.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
70.	When someone I don't know very well asks me to remember something, I get nervous.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
71.	I have no trouble remembering where I have put things.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly

72.	It is easier for most people to remember things that are unrelated to each other than things that are related,	1 a. 2 b. 3 c. 4 d. 5 e.	agree strongly agree undecided disagree disagree strongly
73.	Even if I work on it, my memory ability will go downhill.	1 a. 2 b. 3 c. 4 d. 5 e.	agree strongly agree undecided disagree disagree strongly
74.	Most people find it easier to remember concrete things than abstract things.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
75.	Do you make mental images or pictures to help you remember?	1 a. 2 b. 3 c. 4 d. 5 e.	never rarely sometimes often always
76.	I know of someone in my family whose memory improved significantly in old age.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
77.	I am good at remembering things like recipes.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
78.	I get anxious when I have to do something I haven't done for a long time.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
79.	It bothers me when I forget an appointment.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly

80.	Most people find it easier to remember things that happen to them than things that happen to others.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
81.	Do you mentally repeat something you are trying to remember?	1 a. 2 b. 3 c. 4 d. 5 e.	never rarely sometimes often always
82.	My memory has improved greatly in the last 10 years.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
83.	I like to remember things on my own, without relying on other people to remind me.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
84.	I get tense and anxious when I feel my memory is not as good as other people's.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
85.	Do you ask other people to remind you of something?	1 a. 2 b. 3 c. 4 d. 5 e.	never rarely sometimes often always
86.	I'm highly motivated to remember new things I learn.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
87.	I do not get flustered when I am put on the spot to remember new things.	1 a. 2 b. 3 c. 4 d. 5 e.	agree strongly agree undecided disagree disagree strongly

88.	I am good at remembering titles of books, films, or plays.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
89.	My memory has declined greatly in the last 10 years.	1 a. 2 b. 3 c. 4 d. 5 e.	agree strongly agree undecided disagree disagree strongly
90.	For most people it is easier to remember things in which they are most interested than things in which they are less interested.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
91.	I have no trouble remembering lyrics of songs.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
92.	My memory will get better as I get older.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
93.	It is easier for most people to remember bizarre things than usual things.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
94.	Do you write yourself reminder notes?	1 a. 2 b. 3 c. 4 d. 5 e.	never rarely sometimes often always
95.	I am good at remembering names of musical selections.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly

96.	Most people find it easier to remember visual things than verbal things.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
97.	After I have read a book I have no difficulty remembering factual information from it.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
98.	Do you write appointments on a calendar to help you remember them?	1 a. 2 b. 3 c. 4 d. 5 e.	never rarely sometimes often always
99.	I would feel very anxious if I visited a new place and had to remember how to find my way back.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
100.	I am good at remembering the content of news articles and broadcasts.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
101.	No matter how hard a person works on his memory, it cannot be improved very much.	1 a. 2 b. 3 c. 4 d. 5e.	agree strongly agree undecided disagree disagree strongly
102.	If I were to work on my memory I could improve it.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly
103.	It gives me great satisfaction to remember things I thought I had forgotten.	5 a. 4 b. 3 c. 2 d. 1 e.	agree strongly agree undecided disagree disagree strongly

104.	Remembering the plots of stories and novels is easy for me.	5 a. agree strongly 4 b. agree 3 c. undecided 2 d. disagree 1 e. disagree strongly
105.	I am usually able to remember exactly where I read or heard a specific thing.	5 a. agree strongly 4 b. agree 3 c. undecided 2 d. disagree 1 e. disagree strongly
106.	I think a good memory comes mostly from working at it.	5 a. agree strongly 4 b. agree 3 c. undecided 2 d. disagree 1 e. disagree strongly
107.	Most people find it easier to remember unorganized things than organized things.	1 a. agree strongly 2 b. agree 3 c. undecided 4 d. disagree 5 e. disagree strongly
108.	Do you write shopping lists?	1 a. never 2 b. rarely 3 c. sometimes 4 d. often 5 e. always

Rivermead Behavioural Memory Test (RBMT)

1 & 2 First and Last Name

First: 1 2 Last: 1 2

Raw Score: ____

3. Belonging

Item: 1 2 Place: 1 2

Raw Score: ____

4. Appointment

Spontaneous ____ Prompt ____

Raw Score: ____

5. Pictures

1 2 3 4 5 6 7 8 9 10

Correctly identified: ____ False positive: ____

6 Story (immediate) Raw Score: ____

7. Story (delayed) Raw Score: ____

8. Faces

1 2 3 4 5 6 7 8 9 10

Correctly identified: ____ False positive: ____

9. Route

1 2 3 4 5

Raw Score: ____

10. Message (immediate)

    Pick-up____ Pick-up (prompt) ____ Left correctly____

11. Message (delayed)

    Pick-up____ Pick-up (prompt) ____ Left correctly____

12. Orientation and Date

    Year: ____ Month:____ Day of week: ____ Date: ____ Place: ____

    City of town: ____ Age: ____ Year Born: ____

    Prime minister (Taiwan): ____ President (USA): ____

簡短式心理記憶量表 (Short Portable Mental Status Questionnaire, SPMSQ)

如果個案家中沒有電話，則改問 4A.　最後紀錄總錯誤題數。

1.　今天是幾年幾月幾日? _____ ____

2.　今天是星期幾? _____ _____

3. 這個地方是哪裡? _____ _____

4. 你的電話是多少? _____ _____

4 A. 你家的住址是?　_____ _____

5. 你今年是幾歲? _____

6. 你是哪一年出生? _____

7. 現在總統是誰? _____

8. 他的前任總統是誰? _____

9. 您母親的本姓是? _____

10. 20-3-3-3-3-3-3= ?

_____　　總錯誤題數

背 景 資 料

編號: _____

1. 性別: 女性_____ 男性_____
2. 年齡:_____歲
3. 婚姻狀況: 結婚_____單身_____鰥寡_____分居_____
   離婚_____同居_____其它_____
4. 居住狀況: 獨居_____與配偶同住_____與小孩同住_____
   與小孩及配偶同住_____
5. 教育程度: 不識字_____小學_____國中_____高中_____
   專科_____大學_____碩士_____博士_____
   受教育年數_____ 年
6. 慢性疾病 (醫護人員的診斷): 沒有_____ 有_____

   高血壓_____ 心臟病_____ 糖尿病_____
   肺部(氣喘/慢性支氣管炎)_____中風_____
   胃潰瘍_____ 感官_____ 癌症_____
   關節炎/風濕 _____ 情緒/精神_____ 其他_____

健康自我感受量表 (Self-Rated Health Status)

1. 您自覺現在的健康狀況如何?

   非常好_____ 很好_____ 普通_____ 不好_____

2. 您現在的健康狀況跟三年前比起來，是比較好、一樣還是比較不好?

   比較好_____ 一樣_____ 比較不好_____

3. 您的健康問題會妨礙您想要做的事嗎?

   一點也不會_____ 也一些_____ 妨礙很大____

4. 您覺得您的健康狀況跟同年齡的人比起來是比較好、一樣還是比較不好?

   比較好_____ 一樣_____ 比較不好_____

記憶效能量表 (Memory Efficacy, ME)

1. “我知道如何讓我的記憶力不會因年齡增加而變差”

不是 是

1 2 3 4 5 6 7 8 9 10

一點信心 中度 100%

2. “我可以藉由自己或別人的幫助找到方法來保持記憶力”

不是 是

1 2 3 4 5 6 7 8 9 10

一點信心 中度 100%

3. “如果我知道有什麼方法可以保持我的記憶力不退化，我會努力使用這些方法”

不是 是

1 2 3 4 5 6 7 8 9 10

一點信心 中度 100%

4. ”如果有必要，我會在我年紀較大時找另一個人幫我記事情”

不是 是

1 2 3 4 5 6 7 8 9 10

一點信心 中度 100%

* 您現在的記憶力如何?

1.很差____ 2.差____ 3.尚可____ 4.普通____ 5.良好____ 6.很好____

7.非常好___

成人記憶問卷 (Metamemory in Adulthood, MIA)

1. 對大多數人來說，記有趣味的事比無趣的事容易。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
2. 我很會記名字。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
3. 你會把一些重要日子，例如生日或紀念日的日期寫在一張單子上或標示出來嗎?	1.	從來沒有
	2.	很少
	3.	有時候
	4.	常常
	5.	總是
4. 有好的記憶力對我來說很重要。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
5. 當我記不住一些事情時，我會感到心煩。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
6. 當你找不到東西時，你會試著回想原來放置的步驟來找到它嗎?	1.	從來沒有
	2.	很少
	3.	有時候
	4.	常常
	5.	總是
7. 我認爲有好的記憶力是很光榮高興的事。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意

8.當我心煩時，我比較記不住事情。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
9. 我很會記別人的生日。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
10. 我現在可以和以前一樣記住事情。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
11. 當你看書或雜誌時，你會在停下來的地方做記號嗎?	1.	從來沒有
	2.	很少
	3.	有時候
	4.	常常
	5.	總是
12. 當我被要求去記住事情時，我會感到焦慮。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
13. 當別人注意到我記憶力不好時，我會感到困擾。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
14. 我現在記事情的能力比以前差。	1.	非常同意
	2.	同意
	3.	無法決定
	4.	不同意
	5.	非常不同意

15. 當我焦慮時，比較難記住事情。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
16. 我年紀越大越記不清楚事情。	1.	非常同意
	2.	同意
	3.	無法決定
	4.	不同意
	5.	非常不同意
17. 你在一天開始時，會想一下今天要做的事，以便記住你應該做的事嗎?	1.	從來沒有
	2.	很少
	3.	有時候
	4.	常常
	5.	總是
18. 我的記憶力和以前一樣好。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
19. 對我來說，要記住跟別人約定的事是沒有問題的。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
20. 對大多數人來說，記馬上要用的資料比長時間不會用到的資料容易。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
21. 大多數人覺得記他們想要去或需要去的地方，比從來不會去的地方容易。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意

22. 當我需要用記憶力去嘗試解決問題時，我經常感到不安。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
23. 如果要我介紹一個我才剛認識的人，我會覺得很不安。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
24. 有較好的記憶力是很好，但那不是非常重要。	1.	非常同意
	2.	同意
	3.	無法決定
	4.	不同意
	5.	非常不同意
25. 你會在明顯的地方，例如記事簿或冰箱上貼上提示來提醒你要做的事嗎?	1.	從來沒有
	2.	很少
	3.	有時候
	4.	常常
	5.	總是
26. 我不會因忘記應該要記住的事而困擾。	1.	非常同意
	2.	同意
	3.	無法決定
	4.	不同意
	5.	非常不同意
27. 我很不會記一些瑣碎的小事情。	1.	非常同意
	2.	同意
	3.	無法決定
	4.	不同意
	5.	非常不同意
28. 比起10年前，我現在比較記不住報紙和電視播報的內容。	1.	非常同意
	2.	同意
	3.	無法決定
	4.	不同意
	5.	非常不同意

29. 你會把東西放在固定地點，以方便你要找它們嗎?	1.	從來沒有
	2.	很少
	3.	有時候
	4.	常常
	5.	總是
30. 比起10年前，我現在比較記不住書名、電影或戲劇的片名。	1.	非常同意
	2.	同意
	3.	無法決定
	4.	不同意
	5.	非常不同意
31. 對大多數人來說，記要用的字比從來不會用的字容易。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
32. 比起10年前，我現在比較記不住我做過的夢。	1.	非常同意
	2.	同意
	3.	無法決定
	4.	不同意
	5.	非常不同意
33. 在我這個年齡，不會期望自己很會記郵遞區號。	1.	非常同意
	2.	同意
	3.	無法決定
	4.	不同意
	5.	非常不同意
34. 大多數人覺得要記討厭的人的名字，比起很少注意到的人的名字容易。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
35. 我不太能掌控我的記憶力。	1.	非常同意
	2.	同意
	3.	無法決定
	4.	不同意
	5.	非常不同意

36. 當你要帶東西出門時，你會把它放在明顯的地方嗎?	1.	從來沒有
	2.	很少
	3.	有時候
	4.	常常
	5.	總是
37. 我認爲努力去維持我的記憶力是重要的。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
38. 比起年輕時，我現在比較常把東西放錯地方。	1.	非常同意
	2.	同意
	3.	無法決定
	4.	不同意
	5.	非常不同意
39. 當人們年紀越大時，越常忘記放東西的位置。	1.	非常同意
	2.	同意
	3.	無法決定
	4.	不同意
	5.	非常不同意
40. 我努力的試著要增強我的記憶力。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
41. 比起10年前，我現在比較常忘記跟別人約定的事。	1.	非常同意
	2.	同意
	3.	無法決定
	4.	不同意
	5.	非常不同意
42. 當我需要在眾人面前，馬上說出剛記得的人名，我會有困難。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意

43. 對大多數人來說，記特別喜歡的人的名字比沒什麼印像的人的名字容易。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
44. 大多數人覺得，記他們了解的字比沒有意義的字容易。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
45. 我記重要事件的能力，在過去10年中有進步。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
46. 我佩服記憶力好的人。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
47. 我的朋友常會注意我的記憶力。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
48. 當你在回想曾接觸過的人，你會把他們名字和長相聯想在一起嗎?	1.	從來沒有
	2.	很少
	3.	有時候
	4.	常常
	5.	總是
49. 我很會記事件發生的順序。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意

50. 對大多數人來說，記他們看過或聽過的字比全新的字容易。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
51. 記熟悉的事比不熟悉的事容易。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
52. 我很會記我和別人曾經有過的談話。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
53. 假如我現在要考一個記憶力或類似的測驗，我會感到緊張。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
54. 我年紀越大，記電話號碼的能力會越差。	1.	非常同意
	2.	同意
	3.	無法決定
	4.	不同意
	5.	非常不同意
55. 我常會注意朋友記憶力的狀況。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
56. 過去10年來，我記日期的能力退步很多。	1.	非常同意
	2.	同意
	3.	無法決定
	4.	不同意
	5.	非常不同意

57. 當你想不起某些事情時，你會試著回想類似的事來幫助你嗎?	1.	從來沒有
	2.	很少
	3.	有時候
	4.	常常
	5.	總是
58. 過去10年來，我記名字的能力退步很多。	1.	非常同意
	2.	同意
	3.	無法決定
	4.	不同意
	5.	非常不同意
59. 我常會忘記是誰和我一起去參加聚會。	1.	非常同意
	2.	同意
	3.	無法決定
	4.	不同意
	5.	非常不同意
60. 你會特別回想一天做過的事，來幫助你記起某些事嗎?	1.	從來沒有
	2.	很少
	3.	有時候
	4.	常常
	5.	總是
61. 只要練習我的記憶力，它就不會退步。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
62. 我很會記我曾經去過的地方。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
63. 如果持續使用我的記憶力，我將永遠不會失去它。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意

64. 你會將現在想要記的事聯想到某件事， 以便增加以後記住它嗎?	1. 2. 3. 4. 5.	從來沒有 很少 有時候 常常 總是
65. 對我來說，能非常正確的記住別人的名字是重要的。	5. 4. 3. 2. 1.	非常同意 同意 無法決定 不同意 非常不同意
66. 當我在社交場合中感到緊張和不安時，我沒有辦法 清楚的記別人的名字。	5. 4. 3. 2. 1.	非常同意 同意 無法決定 不同意 非常不同意
67. 你會試著專心去記你想要記的事嗎?	1. 2. 3. 4. 5.	從來沒有 很少 有時候 常常 總是
68. 對我來說，很正確的記得重要日期是要緊的。	5. 4. 3. 2. 1.	非常同意 同意 無法決定 不同意 非常不同意
69. 要保持記憶力不退步是由我自己決定。	5. 4. 3. 2. 1.	非常同意 同意 無法決定 不同意 非常不同意
70. 當一個不熟悉的人要我記一些事情時，我會感到緊張。	5. 4. 3. 2. 1.	非常同意 同意 無法決定 不同意 非常不同意

71. 記得我把東西放在哪裡沒有什麼困難。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
72. 對大多數人來說，記彼此不相關事的比有相關的事容易。	1.	非常同意
	2.	同意
	3.	無法決定
	4.	不同意
	5.	非常不同意
73. 即使練習，我的記憶力仍會越來越差。	1.	非常同意
	2.	同意
	3.	無法決定
	4.	不同意
	5.	非常不同意
74. 大多數人覺得記具體的事比抽象的事容易。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
75. 你會想像一些事物來幫你記住事情嗎?	1.	從來沒有
	2.	很少
	3.	有時候
	4.	常常
	5.	總是
76. 我知道在我家族中，有人在年紀大時記憶力明顯增強。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
77. 我很會記一些事物，像是食譜或其它事物。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意

78. 當我必須做很久沒做過的事情時，我會焦慮。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
79. 當我忘記與別人約定的事時，我會很困擾。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
80. 大多數人覺得記發生在自己身上的事， 比發生在別人身上的事容易。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
81. 你會在腦海中重覆要記的事情嗎?	1.	從來沒有
	2.	很少
	3.	有時候
	4.	常常
	5.	總是
82. 過去10年中，我的記憶力進步很多。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
83. 我喜歡靠自己去記事情，不靠別人的提醒。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
84. 當我覺得我的記憶力不如別人時，我會緊張焦慮。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意

85. 你會請別人提醒你某些事情嗎?	1.	從來沒有
	2.	很少
	3.	有時候
	4.	常常
	5.	總是
86. 我有很強的動機要去記新學到的東西。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
87. 當我需要在眾人面前，馬上去記新的事情時，我不會感到慌張不安。	1.	非常同意
	2.	同意
	3.	無法決定
	4.	不同意
	5.	非常不同意
88. 我很會記書名、電影和戲劇的片名。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
89. 過去10年中，我的記憶力退步很多。	1.	非常同意
	2.	同意
	3.	無法決定
	4.	不同意
	5.	非常不同意
90. 大多數人覺得記他們最感興趣的事比沒興趣的事容易。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
91. 我記歌詞沒有什麼問題。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意

92. 我的年紀越大，記憶力會越好。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
93. 大多數人覺得記奇怪的事比一般的事容易。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
94. 你會寫字條提醒自己嗎?	1.	從來沒有
	2.	很少
	3.	有時候
	4.	常常
	5.	總是
95. 我很會記歌名。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
96. 大多數人覺得記有圖像的事比口述的事容易。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
97. 讀完一本書後，要我記書中真實的資料是沒有問題的。 (例如人名、日期)	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
98. 你會在日曆上寫下與人約定的事嗎?	1.	從來沒有
	2.	很少
	3.	有時候
	4.	常常
	5.	總是

99. 假如我去一個新地方而且要記住回程，我會非常焦慮。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
100. 我很會記報紙和新聞廣播的內容。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
101. 不管一個人多努力的練習他的記憶力， 記憶力不會改善太多。	1.	非常同意
	2.	同意
	3.	無法決定
	4.	不同意
	5.	非常不同意
102. 只要有在使用我的記憶力，我可以增強它。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
103. 如果我想起以爲已經忘記的事，我會感到很滿足。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
104. 記故事和小說中的情節，對我來說是容易的。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
105. 我通常能正確記得在哪讀過或聽過一件特別的事。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意

106. 有良好的記憶力大部分是因爲經常在使用它。	5.	非常同意
	4.	同意
	3.	無法決定
	2.	不同意
	1.	非常不同意
107. 大多數人覺得記沒有組織的事比有組織的事容易。	1.	非常同意
	2.	同意
	3.	無法決定
	4.	不同意
	5.	非常不同意
108. 在買東西前，你會列出購物清單嗎?	1.	從來沒有
	2.	很少
	3.	有時候
	4.	常常
	5.	總是

瑞河敏記憶行爲測驗Rivermead Behavioural Memory Test (RBMT)

日期:

號碼:

1 & 2 姓氏和名字

名字: 1 2 姓氏: 1 2

原始分數: ____

3. 個人物品

物品: 1 2 地點: 1 2

原始分數: ____

4. 約定的事

自動 ____ 提醒____

原始分數: ____

5. 圖片

1 2 3 4 5 6 7 8 9 10

正確: ____ 錯誤: ____

6. 故事 (立即) 原始分數: ____

7. 故事 (延遲) 原始分數: ____

8. 臉孔

1 2 3 4 5 6 7 8 9 10

正確: ____ 錯誤: ____

9. 路線

1 2 3 4 5

原始分數: ____

10. 訊息 (立即)

自動____ 提醒____ 放在正確的地方____

11. 訊息 (延遲)

自動____ 提醒____ 放在正確的地方____

12. 環境及日期

年代:____ 月份: ____ 星期幾: ____ 日期: ____ 地點: ____

城市: ____ 年紀: ____ 哪年出生: ____

行政院長: ____ 美國總統: ____

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Vita

Wen-Miao Liu was born in Taichung city located in central Taiwan. After completing her associate degree program in nursing at Hungkuang University in 1988, she worked as a staff nurse in a district hospital. She then received her Bachelor of Science in Nursing from University of Sydney in Australia in 1992. With the inspiration of nursing faculty in the previous schools, she furthered her study in nursing at Pennsylvania State University, and earned her Master of Science in Nursing in1994 with the specialty in gerontological nursing. She worked as nursing instructor at both Fooyin University and its affiliated hospital from 1994 to 1998. She joined nursing faculty at Central Taiwan University from August 1998 to July 2004. She entered the doctoral program in School of Nursing at the University of Texas at Austin in 2004.

Permanent address: 8F, No.170 Dadun Rd. Nantun District, Taichung City 40878, Taiwan.

This dissertation was typed by the author.